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ABSTRACT

THE RELATIONSHIP BETWEEN COLLECTIVE-EFFICACY AND STUDENT
ACHIEVEMENT IN VOCATIONAL/TECHNICAL HIGH SCHOOLS

by

Rosemary Tralli

Chair: James A. Tucker

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University

School of Education

Title: THE RELATIONSHIP BETWEEN COLLECTIVE-EFFICACY AND
STUDENT ACHIEVEMENT IN VOCATIONAL/TECHNICAL HIGH
SCHOOLS

Name of researcher: Rosemary Tralli

Name and degree of faculty chair: James A. Tucker, Ph.D.

Date completed: May 2008

Purpose

The impact of teachers' efficacious beliefs on achievement in technical high schools required further investigation. This study examined the collective-efficacy beliefs of academic and trade departments in 17 Connecticut technical high schools and the relationship between those beliefs and student achievement.

Method

The collective-efficacy beliefs of 730 teachers were measured through use of the Collective Teacher-Efficacy Belief Scale. Perceptions of influence over instruction, discipline, and overall efficacy were obtained. A sample of 2,592 students was used to obtain achievement data in mathematics, science, reading, and writing on the Connecticut

Academic Performance Test. Multiple regression analysis was used to determine correlations between collective-efficacy beliefs and achievement. A confirmatory factor-analysis was completed to assure the reliability of the test instrument.

Results

A significant relationship was evidenced between teacher perceptions of collective-efficacy and student achievement in mathematics, science, reading, and writing. Achievement in math and science were most effectively predicted by the collective teacher beliefs around school discipline. Reading and writing achievement were most effectively predicted by the overall perceptions of teachers' collective-efficacy. Additionally, the results supported the relationship between socioeconomic status of schools and student achievement. Collective-efficacy beliefs about student discipline were lower at schools that served students of lower socioeconomic status. The Collective-Efficacy Belief Scale met confirmatory factor analysis examination. All but one item loaded under expected components of Instruction and Discipline.

Conclusions

The collective-efficacy beliefs of educators were important considerations as school leaders develop safe, orderly, and productive learning environments. Since efficacy around behavior was particularly influential, leaders need to ensure disciplinary control. Organizations need to provide explicit opportunities for teachers and administrators to measure and develop their sense of efficacy and beliefs about student learning as a key component of reflective school practice.

Andrews University

School of Education

THE RELATIONSHIP BETWEEN COLLECTIVE-EFFICACY AND STUDENT
ACHIEVEMENT IN VOCATIONAL/TECHNICAL HIGH SCHOOLS

A Dissertation

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Rosemary Tralli

May 2008

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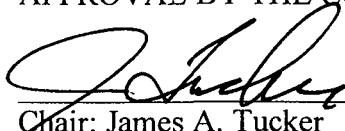
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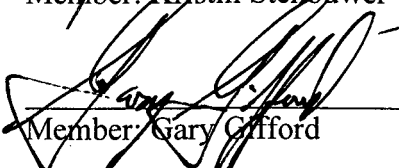
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LIST OF ABBREVIATIONS

CAPT	Connecticut Academic Performance Test
CE	Collective Efficacy
CTEBS	Collective Teacher-Efficacy Belief Scale
GTE	General Teaching Efficacy
HOUSSE	High Objective, Uniform State Standard of Evaluation
NCLB	No Child Left Behind Act of 2001
PTE	Personal Teaching Efficacy
RAND	Research and Development Corporation
SCT	Social Cognitive Theory
SCCT	Social Cognitive Career Theory
TES	Teacher Efficacy Scale

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CHAPTER 1

INTRODUCTION

Background to the Study

Leadership in Education Reform Efforts

In efforts to increase student achievement, current United States federal mandates prompt unprecedented levels of state and local accountability (Reeves, 2004). School leaders across the country face enormous challenges as “those in charge are saddled with enormous and growing burdens, including insufficient budgets; bureaucratic inertia; political conflicts; and a torrent of local, state and federal mandates” (Weiss, 2005, p. 1).

Under the No Child Left Behind (NCLB) Act of 2001, states had to indicate how they would close the achievement gap for diverse student groups (No Child Left Behind Act, 2001). Schools developed and published report cards that informed the public of their annual progress in improving student outcomes. Schools that did not make adequate yearly progress would be restructured (U.S. Department of Education, 2005). Additionally, every state needed to ensure that all students are taught by highly qualified teachers. Although the No Child Left Behind Act of 2001 defined “highly qualified” status through certification processes, many other teacher factors were recognized as critical to student achievement (U.S. Department of Education, 2006).

School reform was a leading area of investigation over the past 3 decades (Elmore, 1990). Two notable initiatives in these reforms are illustrative of the ineffective

efforts made in this era. In 1983, the National Commission on Excellence in Education report entitled *A Nation at Risk* raised deep concerns over the mediocrity of society regarding educational practices in the United States (U.S. Department of Education, 1983). For 5 years after that report, initiatives under the Excellence Movement researched and encouraged new avenues to increase funds and services for schools across the country; these efforts, however, failed to result in notable student achievement advances (Elmore, 1990). In 1989, another notable initiative was introduced to support student achievement. The Goals 2000: Educate America Act included seven goals to support student achievement with a focus on the use of site-based processes to actualize these goals (Goals 2000: Educate America Act, 1994). Despite efforts to empower local schools through this movement, there was little evidence of student growth (Guskey & Passaro, 1994; WestEd, 2003). Guskey asserts, "The gap in education between our knowledge base and general practice remains depressingly large" (Guskey & Passaro, 1994, p. 6).

Teacher Qualifications to Support Instructional Practice

Teacher qualification is a primary component in federal efforts to increase student achievement under the No Child Left Behind Act of 2001 (U.S. Department of Education, 2006). All states were required to ensure that teachers were highly qualified by the 2005-2006 school year. To achieve this goal, states were required to define the extent to which students are taught by highly qualified teachers, develop goals and plans to increase teacher qualifications, and publicize their efforts in meeting this requirement (No Child Left Behind Act, 2001). To be deemed highly qualified under the No Child Left Behind Act of 2001, teachers needed to (a) have a bachelor's degree, (b) have full

state certification or licensure, and (c) prove that they know each subject they teach.

New teachers in middle schools and high schools needed to show evidence of proficiency in their subject matter by (a) earning a major in the subject they teach, (b) earning credits equivalent to a major in the subject, (c) passing a state-developed test, (d) earning an advanced certification from the state, or (e) earning a graduate degree (No Child Left Behind Act, 2001).

Current teachers were able to demonstrate proficiency through a High, Objective, Uniform State Standard of Evaluation (HOUSSE) that might be developed by individual states; evidence of competence could be indicated through a combination of teaching experience, professional development, and knowledge in the subject acquired throughout their careers (No Child Left Behind Act, 2001).

Current school reforms continue to explore the interplay between teacher practices, school infrastructure supports, curriculum, and assessment (Elmore, 2006). Under the No Child Left Behind Act of 2001 and the Individuals with Disabilities Act of 2004, schools were expected to identify and implement programs that are grounded in scientifically based research. "Scientifically based research" involved the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs (No Child Left Behind Act, 2001). Teachers were expected to learn and use these practices to improve student achievement (Johnson & Stevens, 2006). As with past reform efforts, however, teachers' implementation of effective instructional techniques was inconsistent and not readily sustained (Hall & Hord, 2006).

The Role of Efficacious Beliefs in Quality Instruction

Teacher-efficacy research has contributed important information about the relationship between instructional perceptions and instructional quality (Pajares, 1997). Linked to the constructs of Social Cognitive Theory, perceived self-efficacy was defined as people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It was concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses (Bandura, 1986, p. 391).

Teachers' self-efficacy ratings were predictive of student achievement (Weber & Omotani, 1994). Teachers with stronger efficacy beliefs developed more challenging instructional activities and instructional goals for their students (Brophy, 1986; Burton, 1995; Pajares, 1996; Ross, 1994). Teachers with stronger efficacy levels were more likely to help students to achieve their end-of-year goals (Allinder, 1995). Efficacy was linked to teachers' levels of professional commitment (Coladarci, 1992).

Information on the relationship between school-wide collective-efficacy and student achievement was also important in examining teacher quality (Tagger, 2002; Tschannen-Moran & Barr, 2004; Walumbwa, Wang, Lawler, & Shi, 2004). Collective-efficacy referred to each person's assessment of the group's joint capacity to perform job-related behaviors (Riggs, Warka, Babasa, Betancourt, & Hooker, 1994). Greater student achievement was noted in schools with high collective teacher-efficacy (Bandura, 2000; Goddard & Goddard, 2001; Goddard, LoGerfo, & Hoy, 2004). Teacher involvement in school-based decision-making was linked to collective-efficacy (Goddard, Hoy, & Woolfolk Hoy, 2004; Ross & Gray, 2004). The direct and indirect influences of efficacy

on other factors that contributed to student achievement were important areas for future exploration (Goddard, Hoy, et al., 2004).

Statement of the Problem

Federal and state governments were very interested in finding ways to increase student achievement. Despite governmental mandates for high-quality instruction, student achievement had not increased to proficient levels. Toward that end, Elmore (2006) indicated, "Rigorous and engaging instruction remains all too rare across schools of all types" (p. 3). When analyzing the connections between teachers' collective-efficacy beliefs and student achievement, Mawhinney, Haas, and Wood (2005) stated, "Significantly for school districts faced with the sanctions imposed by NCLB as a result of lower school performance, once established, collective efficacy beliefs are hard to change" (p. 8).

Teacher implementation of research-based instructional practices was integral to student achievement, yet teachers were often perceived to be resistant to school improvement efforts. This study examined one area of resistance by identifying the impact of efficacious beliefs on teacher instruction. Perceived collective-efficacy influenced teachers' decisions to implement instructional pedagogy (Tschannen-Moran & Barr, 2004). More research was needed to determine how teachers learn new instructional approaches and on the work conditions that impact teacher acquisition of new skills (Elmore, Peterson, & McCarthey, 1996).

Mawhinney et al. (2005) indicated the need for further research on the effects of collective efficacy and sources of collective-efficacy in professional learning communities. Pajares (1996) indicated the need for research to augment the connection

between efficacy and specific critical variables that may increase achievement. Toward that end, additional research may clarify the interplay between collective-efficacy and student achievement within settings.

Purpose of the Study

This study explored the relationship between collective-efficacy beliefs of teachers and student achievement. Specifically, this study examined the collective-efficacy beliefs of academic and trade departments in 17 Connecticut technical high schools and the relationship between those beliefs and student achievement on the Connecticut Academic Performance Test. The study provides important information to instructional leaders about change mechanisms that promote student growth by unveiling associations between key school factors. It is particularly relevant in that it studies these associations at vocational-technical high-school settings. Lindley (2006) noted the importance of ongoing research that investigates the relationship of efficacy to vocational outcomes. As a result of this research, instructional leaders in vocational-technical high schools may apply new knowledge of the relationships between collective-efficacy and student achievement to create stronger professional learning environments in their schools.

Importance of the Study

This research contributes new information about the relationship between collective-efficacy and student achievement within vocational-technical high-school settings. Although the direct relationship between collective-efficacy and student achievement has been clearly established (Bandura, 2001), the predictive value of

collective-efficacy to aspects of student achievement in vocational-technical high schools is not well documented in the literature. Vaz (2006) noted, "There is a minimal amount of research regarding predictors of success in academic performance in vocational education at the high school level" (p. 21).

Pajares (1996) indicated,

When efficacy beliefs are globally assessed and/or do not correspond with the critical tasks with which they are compared, their predictive value is diminished or can even be nullified; and when efficacy assessments are tailored to the critical task, prediction is enhanced. (p. 6)

This study provides important information about leadership mechanisms that promote student growth by unveiling direct and indirect associations between key school factors within a vocational-technical high-school setting.

Few studies made a priori predictions about what organizational properties were related to school effectiveness or student achievement, and that remains the case today. Even fewer studies described the processes and mechanisms that link school properties to student achievement (Hoy, Smith, & Sweetland, 2002, p. 186).

The identification of critical relationships between collective-efficacy and achievement would provide such helpful information to school leaders. Ross, Hogaboam-Gray, and Gray (2004) indicated,

School processes that promoted teacher ownership of school directions (shared school goals, school-wide decision making, fit of plans with school needs, and empowering principal leadership) exerted an even stronger influence on collective teacher efficacy than prior student achievement. (p. 1)

Analysis of the relationship between these factors within school settings may promote more substantive professional development (Guskey, 2000) and professional learning-communities (Hall & Hord, 2006) which, in turn, may promote greater student

achievement and school-based leadership. This research has pragmatic implications in that the instrumentation is readily accessible by all school leaders. The current drive in schools for data-driven decision-making makes this research particularly feasible and important (Reeves, 2004).

Research Questions

1. Is there a relationship between the degree of perceived collective-efficacy and student achievement in mathematics?
2. Is there a relationship between the degree of perceived collective-efficacy and student achievement in writing?
3. Is there a relationship between the degree of perceived collective-efficacy and student achievement in science?
4. Is there a relationship between the degree of perceived collective-efficacy and student achievement in reading?

Assumptions

I made the following assumptions in this study:

1. Student achievement is dependent on teacher implementation of sound instructional pedagogy.
2. Teachers within vocational-technical settings have unique school characteristics that may impact implementation of sound instructional pedagogy.
3. Teachers control their decisions to use instructional pedagogy.
4. Research-based instructional innovations will serve to increase student achievement if implemented by teachers.

5. There will be no change in outcomes until new practices are implemented (Hall & Hord, 2006).

6. Socioeconomic status accounts for variances in student achievement.

Theoretical Base of the Study

The theoretical base of this study is founded in Social Cognitive Theory (Bandura, 1986). Primary constructs of Social Cognitive Theory include the following:

1. All persons are capable of self-regulated behaviors, or human-agency, in that they can follow an intended course of action.

2. A person's perceptions about his/her capabilities are defined as self-efficacy. Self-efficacy relates to perceptions of competence rather than actual competence levels.

3. Self-efficacy perceptions are high predictors of an individual's behaviors and of changes in behaviors. Perceptions are higher predictors of behavior than actual capabilities.

4. Self-efficacy is a task-specific perception and is therefore different from other self-concepts such as self-concept and self-esteem.

5. The behavioral choices that an individual makes are influenced by the strengths of his or her efficacy beliefs.

6. Self-efficacy beliefs are future-oriented conclusions about the individual's capabilities to act in specific situations or contexts.

Definition of Terms

The contextual definitions of key terms used in this study are provided in this list.

Achievement gap: The disparity between the academic performance of different groups of students largely along economic, racial, and ethnic lines.

Collective teacher-efficacy: Teacher perceptions that the faculty, as a group, can plan and implement procedures that will positively affect their students (Goddard, Hoy, et al., 2004).

Concerns: "The composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task" (Hall & Hord, 2006, p. 61).

Disciplinary examples: Suspension/expulsion rates, detentions, and number of times students are sent out of class.

Highly qualified teachers: To be deemed highly qualified, teachers must have (a) a bachelor's degree, (b) full state certification or licensure, and (c) prove that they know each subject they teach (NCLB).

Human-agency: All persons are capable of self-regulated behaviors.

Innovation: Any process, product, program or idea that is the focus of change.

Personal-efficacy: A person's perceptions about his/her capabilities and relates to perceptions of competence rather than actual competence levels.

Self-efficacy: A person's perceptions about his/her capabilities and relates to perceptions of competence rather than actual competence levels.

Social Cognitive Theory: A theory developed by Albert Bandura stemming from Social Learning Theory; a person's behavior is a result of the interaction of personal factors, behavior, and the environment.

Teacher-efficacy: “Teacher’s judgments of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (Tschannen-Moran & Woolfolk Hoy, 2001, p. 187).

Delimitations of the Study

This study was delimited to teachers within the Connecticut Technical High-School District in Connecticut. The sample included trade and academic teachers who worked at the secondary school level. Due to the large sample of teachers across the district, data were not collected on other school personnel such as counselors, administrators, tutors, paraprofessionals, consultants. Parents and students were not included in the sample.

Limitations of the Study

Due to the vocational components and course schedules of the school program, teachers within this system were not necessarily representative of teachers within more traditional high-school settings. The academic teachers involved in this study worked under unique circumstances. Despite the universal requirements for student achievement under No Child Left Behind, these teachers met with students for half of the number of school days that teachers from non-vocational settings would meet for instructional delivery of academic content. This organizational system was unique. No other school district in the United States used an identical model of course scheduling, program offerings, or admissions. Therefore, the generalizability of this study may be limited.

General Methodology

In this study, I used multiple regression techniques to examine the relationships between teachers' collective-efficacy (independent variable) and student achievement (dependent variable). The sample I used to obtain data for the independent variable included teachers within academic and trade departments from 17 technical high schools. I measured the independent variable through use of a collective-efficacy questionnaire. Student achievement scores from the same schools provided my data for the dependent variable. I included the composite test scores for student achievement in science, math, writing, and reading on the Connecticut Academic Performance Test. I discuss specific instrumentation and statistical measures in chapter 3.

Organization of the Study

Collective-efficacy beliefs of teachers affect professional learning environments and meaningful change efforts (Dellinger, 2001). Strong collective-efficacy of a group of teachers can interfere with reform processes (Collins, 2001) and with student achievement. Pajares (1996) noted,

It would be useful to develop insights about how and why differing interpretations of similar attainments and from similar sources result in different beliefs, as well as how inaccurate self-perceptions are developed and why they can persist even in the face of subsequent successes and strong performance attainments. (p. 544)

My study contributes to the existing research by examining the relationships between collective-efficacy and student achievement in vocational-technical high-school settings.

The remaining chapters of this study include the following information: Chapter 2 provides a review of the literature on school-reform efforts and the role of efficacious beliefs on student achievement. Historical background, instrument descriptors, and

relevant research on efficacy are included. Chapter 3 describes the quantitative methodology of the study. The research design, test instrumentation, and population are defined. Chapter 4 presents the study outcomes including an analysis of the data and overall findings of the study. Chapter 5 provides a summary of the study, its implications, and recommendations for future research.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The literature I review and report in this chapter serves these primary purposes:

(a) to provide a historical perspective on the development and use of Social Cognitive Theory as the theoretical construct for explaining collective-efficacy (independent variable); and (b) to exemplify the relationship of efficacy research to student achievement (dependent variable).

I searched the literature through use of computerized databases. I acquired access to these databases through the State Education Resource Center Library in Connecticut. Keywords I used for this search included *efficacy*, *teacher-efficacy*, *collective-efficacy*, *motivation*, *change*, *innovation*, *student achievement*, *Bandura*, and *Social Cognitive Theory*. I sequenced various permutations of these key words to gain research sources. Initially, I collected and reviewed abstracts for relevance. I acquired full-text articles for abstracts that appeared to contain suitable content, sampling, instrumentation, and methodology. I used article references to investigate additional studies on key topics. Key sources included full research studies by primary sources. I collected information and organized that information in an Endnotes Version 9.1 Library.

I organized this literature review into two main categories. A sequential process for understanding research development in collective-efficacy and its impact on student

achievement is addressed through my division of main headings. The first section provides a historical context. The evolution of Social Cognitive Theory as the foundation of collective-efficacy research is described. I present elaborated definitions of terms and processes within the constructs of Social Cognitive Theory. The second section of this review centers on the research base of teacher-efficacy and student achievement. I have reviewed specific research findings. I provide a discussion of instrumentation issues and research reviews. I present instrumentation types and issues. I have concluded this chapter with a summary statement. My conclusion redefines the critical aspects of research that supported this study.

Historical Perspective on the Social Cognitive Theory

Human-Agency Definition

The construct of human-agency was critical to the development of efficacy research. Human-agency was defined within the context of this study as “the capacity to exercise control over one’s own thought processes, motivation, and actions” (Bandura, 1989a, p. 1175).

Causal Models of Human-Agency

Reese, Reese, and Tausner (1995) reported that roots of the causal model for human agency were founded in the psychodynamic model. This deterministic theory held that all human behavior results from underlying psychological forces that may or may not be within a person’s realm of conscious awareness. These psychological forces were defined as dynamic, since they interact with one another to generate behavior,

thoughts, and emotions. Early life experiences were considered primary motivators for behaviors throughout life (Freud, 1989/1930).

Behavioral-change therapy in the 1950s relied heavily on the psychodynamic model (Stricker & Gold, 2004). By the 1960s, new theories of human-agency emerged. These models moved toward the exploration and consideration of external forces on agency and behavior. Primary conceptual models included mechanical agency and emergent interactive-agency change (Pajares, 1997).

Mechanical agency viewed human behavior and subsequent changes in behavior as conditional to external forces put upon them (Skinner, 1938). Operant-behavior-theory conditioning provided an example of mechanical agency (Skinner, 1958). Under this theory, operant conditioning was a result of the interplay between behaviors and reinforcing outcomes. A behavior that was followed by positive reinforcement would likely be repeated in the future under similar circumstances, whereas a behavior followed by negative reinforcement may not be repeated. Behaviors were commonly learned and reinforced through external molding (Pavlov, 1927). Other popular stimulus-response models within this field included those of Pavlov and Watson. The emphasis on observation behaviors that could be quantitatively measured was the focus of this theoretical base (Pavlov, 1927; Watson, 2006).

Emergent interactive-agency stressed the interactive impact of modeling, self-regulation, and external incentives on behavior (Bandura, 1997). Social Cognitive Theory subscribed to the emergent-interactive model of human-agency. Under this construct, human-agency “addresses the issue of what it means to be human” (Bandura, 2001, p. 6).

Primary Features of Human-Agency

Bandura (1997) defined four domains of human-agency: intentionality, forethought, self-reactiveness, and self-reflectiveness. The importance of each feature to research on collective-efficacy is described in this section.

Intentionality

The concept of intentionality involved deliberate planning for future actions. A key construct of intentionality was the “proactive commitment to bringing them about” (Bandura, 2001, p. 6). Willful planning was based on one’s knowledge of the intended act and of the act’s expected outcome. Human intentionality provided a basis for understanding how persons control their choice of actions based on perceived purposes or outcomes of these actions (Bandura, 1997).

Forethought

Motivations to perform intended actions and self-guidance while completing intended actions were components of forethought (Bandura, 2001). The ability to direct one’s own actions regardless of external influences was a primary component of this feature of agency.

Self-Reactiveness

This feature of agency provided for ways to enact intended plans (Bandura, 2001). Components of this feature included (a) deliberate shaping of opportunities for plan execution, (b) motivating oneself through execution, and (c) manipulating environmental circumstances. Governing functions included self-monitoring, use of personal standards, morals, and ethics to guide plan enactment, and use of self-feedback to make alterations

in plan delivery. This feature illustrated the interplay of factors as one decides to move from intentions to actual fulfillment of an intended plan of action.

Self-Reflectiveness

The ability to evaluate one's own performance was a primary feature of human-agency (Bandura, 2001). This element moved beyond planning, delivery, and manipulation of environmental conditions. The metacognitive ability to evaluate the outcomes of one's actions, motives, and values was important to self-regulation of behaviors. Efficacious belief was an integral component of this construct and moves the concept of human-agency into a broad field of research. Bandura (2001) indicated, "Efficacy beliefs are the foundation of human-agency" (p. 10). Self-efficacy involved the beliefs persons hold regarding their personal levels of control over internal and external influences.

Social Cognitive Theory Underpinnings

In 1987, Albert Bandura proposed a social cognitive theory utilizing human-agency as a foundational underpinning. Primary constructs of Social Cognitive Theory include:

1. All individuals were capable of *human-agency* or the premeditated pursuit of courses of action. They could be proactive, organize themselves, and self-regulate their behaviors.
2. The beliefs that individuals have about their capacities were their perceptions of self-efficacy. It was important to note that efficacy related to an individual's perceptions of competence rather than to actual levels of competence.

3. Self-efficacy perceptions were high predictors of an individual's behaviors and of changes in behaviors. Bandura (1989a) indicated that perceptions are higher predictors than actual capabilities and that either over- or underestimating may influence how well individuals apply their capabilities.

4. Self-efficacy was a task-specific perception and was therefore different from other cognitions such as self-concept and self-esteem. "Self-esteem usually is considered to be a trait reflecting an individual's characteristic affective evaluation of self (e.g., feelings of self-worth or self-liking). By contrast, self-efficacy is a judgment about task capability that is not inherently evaluative" (Gist & Mitchell, 1992, p. 185).

5. The behavioral choices that an individual made were influenced by the strengths of one's own efficacy beliefs.

6. Self-efficacy beliefs were future-oriented conclusions about the individual's capabilities to act in specific situations or contexts.

Social Cognitive Theory provided the conceptual foundation of reciprocal determination as a way to predict an individual's behavior (Pajares, 1997). Behaviors were the result of the ongoing relationship between external, internal forces and of the individual's past and present behaviors. This process, called *triadic reciprocal causation* (Bandura, 2001), involved the interplay of three elements: (a) environmental influences, (b) a person's own behavior, and (c) internal personal factors—cognitive, affective, and biological processes. Figure 1 shows this relationship.

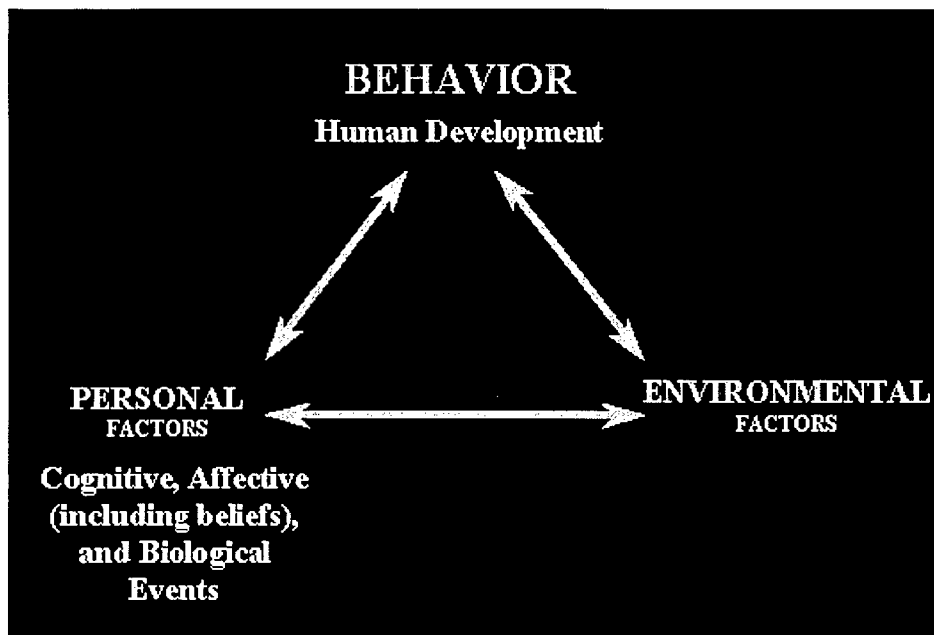


Figure 1. Triadic reciprocal causation. From "Self-efficacy Beliefs in Academic Settings," by F. Pajares, 1996, *Review of Educational Research*, 66(4), pp. 543-578.

Behavior Theory Detractors to Social Cognitive Theory

"The debate over the importance of cognitive constructs in explaining individual behavior has existed for many years" (Earley & Randel, 1995, p. 221). Dougher (1995) pointed to issues concerning the scientific framework of research in the field of efficacy. Bandura and most other mainstream psychologists were working within a mechanical framework, whereas Lee, Hawkins, and most behavioral analysts worked within a relational or contextual framework. These two frameworks entailed significantly different scientific objectives, units of analysis, views of causation, and requirements of an explanation.

From a behavioral perspective, Hawkins (1995) noted that causal implications of efficacy theory might be explained through other sources, such as hypnosis or consistency theories, and that Bandura's model is a "derivative of Rotter's social learning

theory” (p. 238). Lee and Smith (1996) indicated that long-term predictors of behaviors might be identified through various factors other than efficacy. Factors such as cultural differences may affect causation (Early & Randel, 1995). “While the number of theories incorporating cognitive constructs has exploded since the 1950s, skeptics reassert the traditional viewpoint espoused in behaviorism” (Early & Randel, 1995, p. 221).

Sources of Efficacy Development

Bandura (1997) argued that “perceived self-efficacy results from diverse sources of information conveyed vicariously and through social evaluation, as well as through direct experience” (p. 411). He identified four information sources for efficacy building: social persuasion, vicarious experiences, physiological/emotional arousal, and mastery experiences. A person uses information from each of these sources to develop efficacy beliefs through self-referent thought processes. This section provides definitions of these sources and examples related to education.

Social Persuasion

Social persuasion involved the development of beliefs based on the messages an individual receives from the persons around oneself (Bandura, 2001). Verbal judgments of others may build or reduce confidence, and may provide encouragement or negative feedback. These sources of persuasion may affect a person’s decision to act. Although verbal persuasion was considered a weak source of information (Pajares, 1996), teachers might be influenced by verbal persuasion through administrative expectations, thoughts, and reactions from other teachers, parents, and students. Goddard, Hoy, et al. (2004) noted, “Social persuasion is another means of strengthening a faculty’s conviction that

they have the capabilities to set and achieve goals. Talks, workshops, professional development opportunities, and feedback about achievement can inspire action” (p. 8).

Vicarious Experiences

Vicarious experiences included the effects that were formed based on the actions of others (Bandura, 2001). These information sources might have greater impact on persons with less exposure or experience in a given task area (Schunk, 1983). The impact of role models was particularly important in efficacy beliefs that were developed through this source. Teachers might experience the effects of vicarious experiences through school-based peer-coaching, teacher-mentoring, and other teacher model processes (Bandura, 1997).

Physiological Experiences

Physiological/emotional arousal contributed to the development of efficacious beliefs, and in a recursive process beliefs also affect physiological states. In schools, pressures such as high-stakes testing might produce particular arousal states including excitement, relief, anxiety, stress, or fatigue (Bandura, 2001).

Mastery Experiences

Mastery experiences provided direct feedback to the individual about one’s own capabilities to perform a given task (Bandura, 2001). A task outcome that a person perceived to be successful then raised the individual’s efficacy beliefs. Likewise, a perceived negative task outcome decreased efficacy. As a person gained these experiences, a recursive developmental process of efficacy-building occurred. Revised perceptions more likely contributed to the expectations that future performances on

similar tasks would also be either successful or have a negative outcome (Marks, 1999).

Teachers may perceive that successful implementation of an instructional process warranted further use of that process. Social-cognitive theorists argued that mastery experience was the most powerful efficacy source (Knobloch & Whittington, 2003). Genuine accomplishments of respectful tasks coupled with elaborated feedback were highly influential sources of efficacy information. Goddard, LoGerfo, et al. (2004) indicated that collective-efficacy was positively influenced by past mastery experiences and contributed to high-school achievement despite student socioeconomic status.

The key to integration of any of the four information sources was the individual's interpretation of the experience. "Changes in perceived efficacy result from cognitive processing of the diagnostic information that performances convey about capability rather than the performance per se" (Bandura, 1997, p. 81). The weight that was assigned to any particular source experience determined its applicability.

Forms of Human-Agency

Social Cognitive Theory identified three types of influential human-agency: personal-agency, proxy-agency, and collective-agency (Bandura, 1997). Each type of agency carried important implications for motivation, behavior, and impact of outcomes in education in other arenas. Pajares (1996) emphasized the importance of the contextual definitions for agency and efficacy terminology in efficacy research. In this theoretical framework, agency was based on perceptions toward specific task outcomes rather than on general perceptions of ability.

Personal-Agency

This form of agency was the basis for research in the area of teacher-efficacy. Personal-agency involved an individual's perspective on his/her ability to influence actions and outcomes (Bandura, 1997). The initial research on human-agency and efficacy was centered on personal-agency (Pintrich & De Groot, 1990). An in-depth discussion of personal-agency is incorporated in the discussion of teacher-efficacy.

Proxy-Agency

Proxy-agency was explored based on institutionally and socially pragmatic contexts (Shields & Brawley, 2006). Many situations were outside the scope of perceived personal control. In these instances, persons sought group members who had access to desired outcomes. Persons relied on proxy-agency to fulfill needs and intended outcomes that could not be accomplished at the individual level. Perceived need to assign proxy-agency has been based on position, difficulty of tasks, resource access, intensity, and levels of associated responsibility and risks (Bandura, 2001).

Collective-Agency

Bandura identified collective-agency as "people's shared beliefs about their collective power to produce desired results" (Bandura, 2001, p. 6). Many outcomes required collaboration and coordination of knowledge, skills, and services. A person's perceptions about group influence on planning, motivation, and outcomes were essential components of collective-efficacy (Hoy, Sweetland, & Smith, 2002). A comprehensive discussion of collective-agency is integrated into the discussion of collective teacher-efficacy.

Social Cognitive Model of Self-Regulation

Zimmerman's model of self-regulatory processes had important implications in efficacy research. This model was based on the constructs of Social Cognitive Theory. Self-regulatory skills developed through the recursive process of forethought, performance, and self-reflection (Zimmerman, Bandura, & Martinez-Pons, 1992). Self-efficacy beliefs affected the development of the regulatory processes. In efforts to develop proactive strategies that supported changes in behaviors through changes in efficacy perceptions, this model provided important constructs for further research and application (Zimmerman, 2000). In educational research, there was growing interest in the relationships between self-efficacy, academic motivation, and self-regulation (Pintrich & Schunk, 1996).

Impact of Efficacious Beliefs

The research literature supported assumptions that efficacy was a powerful predictor of behavior. Perceived self-efficacy was shown to correlate to specific behaviors in several domains including: affect, motivation, and cognition (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

A primary research area centered on level of affective arousal and the association between efficacy beliefs and the degree of stress and depression one experiences (Bandura, 1989b). A person's perceived ability to cope with a challenging situation and perceived ability to control apprehensive feelings had clinical implications (Malpass, O'Neil, & Hocesvar, 1996; Pederson, Strickland, & DesLauriers, 1991).

A person's efficacious beliefs could impact one's health (Bandura, 2004, 2005) in preventive care and coping with illness and was linked to specific health conditions

including the ability to cope with pain from arthritis (Brekke, Hjortdahl, & Kvien, 2001). Strength of efficacious beliefs was linked to recovery rates from traumatic events (Benight & Bandura, 2004). Efficacy was correlated with vulnerability for depression in females (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). Post-treatment self-efficacy perceptions were linked as a strong predictor for short-term maintenance of smoking cessation (Coelho, 1984; Haaga & Stewart, 1992; Pederson et al., 1991). Binging and obesity in women (Cargill, Clark, Pera, Niaura, & Abrams, 1999) was shown to have a strong relationship to efficacy.

It was partly on the basis of efficacy self-beliefs that people chose what challenges to undertake, how much effort to expend in the endeavor, and how long to persevere in the face of difficulties (Bandura, 1989b). Motivational links between efficacy and social modeling (Bandura, 2003; Schunk, 1983) and goal-setting (Zimmerman et al., 1992) were evidenced.

Efficacy connections to academic motivation and self-regulation were well documented in the research. Efficacy was shown to have a direct bearing on career choices and gender differences in career choices (Betz & Hackett, 1981, 1983, 1986). Task persistence during math problem-solving (Chemers, Hu, & Garcia, 2001), seatwork task-performance quality, and use of self-regulatory strategies (Pintrich & De Groot, 1990) were related to efficacious beliefs.

Student achievement across disciplines was linked to efficacy. Pajares (2003, p. 140) indicated, "Writing self-efficacy makes an independent contribution to the prediction of writing outcomes and plays the mediational role that social cognitive theorists hypothesize" as evidenced through confirmatory research (Meier, McCarthy, &

Schmeck, 1984; Pajares, Miller, & Johnson, 1999; Zimmerman & Bandura, 1994). Math achievement (Malpass et al., 1996) and reading achievement (Tracz & Gibson, 1986) were influenced by teacher efficacy. Students transitioned more successfully from middle to high school when teacher-efficacy was high at the receiving school (Midgley, Feldlaufer, & Eccles, 1989).

Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT) was an extension of Social Cognitive Theory used to explore academic pursuits and career decision-making. The earliest precursor to the development of SCCT was credited to Hackett and Betz (1981) in their seminal study of women's career choices. Their study stimulated a body of research linking self-efficacy and career behavior (Cannon, 2004).

Lent, Brown, and Hackett (1994) used SCCT to examine the ways in which self-efficacy was impacted by socio-cultural factors commonly associated with diverse and disadvantaged populations. The four sources of efficacy identified in Social Cognitive Theory (social persuasion, vicarious experiences, physiological/emotional arousal, and mastery experiences) were viewed in light of the environmental and contextual factors that affect academic and vocational decisions. Factors that affect these decisions included (a) educational and career interests, (b) available choices, and (c) task persistence and performance (Lent et al., 1994).

SCCT was used to determine factors underlying career choices of various populations. Self-efficacy may have had a greater impact on vocational choices in situations where oppression and limited career choices existed (Lent et al., 1994).

Gender and Social Cognitive Career Theory

Gender was a noted socio-cultural factor in research on the relationship between efficacy and career orientation. Women had lower self-efficacy for traditional male jobs (Betz & Hackett, 1981). Gwilliam and Betz (2001) determined similar gender differences, but no racial differences, when measuring the relationship of efficacy and orientation toward math and science fields through three separate instruments. Lapan, Shaughnessy, and Boggs (1996) found that women had lower math self-efficacy, resulting in fewer females entering into math and science fields and in selection of college majors in related areas. Conversely, Hackett and Betz (1989) found that women did not have significantly lower math self-efficacy than men, but efficacy levels of both genders were a stronger predictor of math career orientation than math performance or prior achievement. In a study of eighth-graders, Ji, Lapan, and Tate (2004) found that students had higher self-efficacy for possible career paths that were more traditionally selected by their gender. Mau (2003) found that math self-efficacy and achievement levels in eighth-grade males were the two highest predictors of students' interests in pursuing science and math careers.

Student Populations and Social Cognitive Career Theory

Career decision self-efficacy was noted as a key predictor of vocational expectations of students in various minority and disadvantaged groups. Luzzo and McWhirter (2001) noted that ethnic minority students in the United States demonstrated more perceived educational barriers and lower self-efficacy for coping with perceived career-related barriers than their European-American counterparts. Additionally, Gushue and Whitson (2006) indicated no relation between efficacy and ethnic identity. In a

study of urban African-American high-school students, stronger career decision-making self-efficacy was related to broader career path choices and greater engagement with career exploration processes (Gushue, Scanlan, Pantzer, & Clarke, 2006). Teacher support was positively related to career decision self-efficacy and career outcome expectations for ninth-grade African-American students (Gushue et al., 2006).

Students with disabilities had lower self-efficacy and lower career exploration decisions than their nondisabled peers (Ochs & Roessler, 2004). For students of low socioeconomic status, vocational/educational self-efficacy beliefs significantly predicted their vocational outcome expectations (Ali, McWhirter, & Chronister, 2005; Ali & Saunders, 2006).

Teacher-Efficacy

Teacher-efficacy research was founded in Social Cognitive Theory and was intertwined historically with the model development (Pajares, 1996). Weber and Omotani (1994) noted that teachers' self-efficacy ratings were predictive of student achievement. Teachers who had stronger efficacy beliefs developed more challenging instructional activities and instructional goals for their students than did teachers with lower efficacy beliefs (Brophy, 1986; Burton, 1995; Pajares, 1996; Ross, 1994). Teachers with stronger efficacy levels helped students to achieve their end-of-year goals more regularly than teachers with lower levels of efficacy (Allinder, 1995). Efficacy was linked to teachers' levels of professional commitment (Coladarci, 1992). Teacher-efficacy was influenced most during the first 10 weeks of the school year (Knobloch, 2002) when new teachers were eager and energized in their new positions. Deliberate fostering of efficacious

beliefs supported the development of professional learning-community at the school-site level (Ross & Gray, 2004).

Teacher-Efficacy Instrumentation

Instrumentation Issues

There have been many attempts to develop effective instruments to measure this construct. The definition and measures of teacher-efficacy have been an ongoing source of debate and research. Pajares (1996) stated,

Bandura has cautioned researchers attempting to predict academic outcomes from students' self-efficacy beliefs, that to increase accuracy of prediction, they would be well advised to follow theoretical guidelines regarding specificity of self-efficacy assessment and correspondence with critical tasks. This caution has often gone unheeded in educational research, and efficacy assessments have too often been global and general and have lacked the specificity of measurement, consistency with the critical task, and microanalytic analysis that optimizes the predictive power of self-efficacy beliefs. (p. 30)

Tschannen-Moran et al. (1998) indicated that this debate centers on two broad issues:

1. Whether teacher-efficacy should be measured specifically within the context of specific behaviors, as based on Bandura's definition, and
2. Whether construct validity of scores from primary instruments has been questioned.

Constructs for Instrumentation Development

Bandura (1997) stressed the importance of three domains for efficacy measurement: level, generality, and strength. Level indicated the degree of efficacy beliefs based on the amount of perceived task difficulty. For example, a person's perceived efficacy to complete easy Sudoku puzzles may be higher than his or her perceived efficacy to complete hard Sudoku puzzles. Generality reflected the degree of

transferability of efficacy beliefs between tasks or activities (such as between completing Sudoku puzzles and crossword puzzles). Measurements of strength indicated the intensity of self-efficacy beliefs around one's certainty to perform a given task or activity (Pintrich & De Groot, 1990).

Measurements were further defined and analyzed based on key characteristics that reflect the theoretical base of Social Cognitive Theory (Tschannen-Moran et al., 1998):

1. Efficacy tests focused on capabilities for specific outcomes rather than for general outcomes.
2. Tests were based on mastery criteria rather than normative criteria in that a person's efficacy beliefs are judged against oneself rather than against others.
3. Tests assessed beliefs that are futures oriented.
4. Tests were sensitive to the environmental conditions of a given task.

Historical Review of Instruments

A review of the historical development of teacher-efficacy measurements provided a rationale for analysis and purposeful selection of instrumentation for this research study (Pajares, 1997). Key instruments that represented the evolution of this process are addressed. Bandura's conception of efficacy-measurement constructs served as a foundation for analysis of efficacy instrumentation.

RAND Scale

In 1976, Amour's enhancement of a RAND Research scale was commonly viewed as the precursor to all teacher-efficacy instrumentation. The influence of the RAND scale continued to impact the development of instruments and the ongoing debate

over efficacy research constructs. This early scale measured teachers' perceptions of their control over student motivation and learning. Founded on Locus of Control Theory (Rotter, 1966), student learning and motivation were assumed reinforcers of teaching behaviors. The two relevant items of this questionnaire included the following ideas:

1. When it comes right down to it, a teacher really can't do much because a student's motivation and performance depends on his or her home environment.
2. If a teacher tries really hard, he/she can get through to even the most difficult or unmotivated students.

Teacher-Efficacy Scale

Gibson and Dembo (1984) challenged the two-item RAND scale on both construct definition and reliability. They relabeled the two RAND items to correspond with constructs of Social Cognitive Theory: RAND Item 1 measured general teaching efficacy (GTE) or a teacher's belief of whether teaching can influence student learning regardless of other instructional factors outside the scope of teacher control; RAND Item 2 measured personal teaching efficacy (PTE) or a teacher's perceived ability to have a positive impact on student learning.

Based on this work, Gibson and Dembo developed the Teacher-Efficacy Scale (TES). They further refined the RAND instrument by adding 16 additional items (9 additional items for PTE, and 7 additional items for GTE). This advancement opened opportunities for extensive research that established correlations between teacher-efficacy and educational outcomes (Pajares, 1997).

The Teacher-Efficacy Scale contributed to the development of additional instruments that accounted for the need to ensure contextual specificity. For example, the

Science Teaching Efficacy Belief Instrument (Riggs & Enochs, 1990) specified the personal and outcome expectancy items from the TES for science teachers. Emmer and Hickman (1991) used the TES to correlate efficacy to classroom management. Although the Teacher-Efficacy Scale showed weaknesses in discriminant validity of PTE and GTE scores (Colardarci & Fink, 1995) and weaknesses in factor analysis (Guskey & Passaro, 1994), the instrument initiated research on multiple dimensions of efficacy. Tschannen-Moran et al. (1998) indicated that

a valid measure of teacher efficacy must assess both personal competence and an analysis of the task in terms of the resources and constraints in particular teaching contexts. Most existing measures of teacher efficacy do not include both dimensions of efficacy. (p. 27)

Collective-Efficacy Constructs

The concept of efficacy extended to a collective perspective. Bandura (1997) noted, "Personal-agency operates within a broad network of sociostructural influences" (p. 6) and the "theory extends the analysis of the mechanisms of human-agency to the exercise of collective-agency" (p. 7).

The four sources of efficacy identified in Social Cognitive Theory also applied in the collective domain. Goddard, Hoy, et al. (2004) noted, "Social persuasion is another means of strengthening a faculty's conviction that they have the capabilities to set and achieve goals. Talks, workshops, professional development opportunities, and feedback about achievement can inspire action" (p. 8). Vicarious experiences might have included visits to other teachers' classes, peer-coaching, or site visits and collaborative professional dialogs at model schools. Physiological/emotional feedback may have arisen from the collective expectations of teachers in departments or within schools as

data are collected for high-stakes tests. Mastery experiences that were celebrated and shared could support higher levels of collective-efficacy perception (Mawhinney et al., 2005).

Collective-efficacy represented the beliefs of group members concerning “the performance capability of a social system as a whole” (Bandura, 1997, p. 469). In the context of school settings, collective-efficacy referred to teacher perceptions that the faculty, as a group, could plan and implement procedures that will positively impact their students (Goddard, Hoy, et al., 2004).

Although teachers commonly worked in isolated classrooms for large portions of each work day, Bandura (1997) noted,

People working independently within a group structure do not function as social isolates totally immune to the influence of those around them. . . . The resources, impediments, and opportunities provided by a given system partly determine how efficacious individuals can be, even though their work may be only loosely coupled. (p. 469)

Relationship of Collective-Efficacy and Education

In high-efficacy schools, teachers established challenging instructional benchmarks, instruction to support mastery learning, and believed that their students could reach high academic goals (Bandura, 1997). Students demonstrated higher achievement when their teachers had higher efficacy (Cybulski, 2003; Goddard, 2002; Grass, 2004; Larrick, 2004). Weak collective-efficacy resulted in weaker student gains. Students decreased their own expectations of their math performance after moves from elementary to junior high schools when they moved from high efficacy to lower efficacy teachers (Midgley et al., 1989). High levels of perceived collective-efficacy were associated with high student achievement in high poverty schools (Grass, 2004).

Teacher-efficacy was important because teachers' collective beliefs about their instructional responsibilities impacted the amount of student learning that occurred in their classrooms (Lee & Smith, 1996). Math and reading achievement increased in relation to the degree of collective-efficacy of teachers in low socioeconomic schools (Larrick, 2004). Independent of socioeconomic status, significant positive relationships were evidenced between collective-efficacy and student achievement on state writing-assessments of Grade 8 students (Tschannen-Moran & Barr, 2004). Reading and math achievement increased in elementary schools despite socioeconomic level of students (Cybulski, 2003; Cybulski, Hoy, & Sweetland, 2005; Goddard, Sweetland, & Hoy, 2000).

School culture and climate (Mackenzie, 2000; Marin, 2001) were influenced by collective-efficacy. Teacher feelings of trust toward each other related to collective-efficacy (Adams, 2003; Charvez, 2004; Dale, 2004). Mastery experiences during the professional development on reading strategies increased teachers' sense of collective efficacy (Oxendine, 2005).

School personnel in leadership roles were shown to contribute to the collective-efficacy beliefs of a school (Glenn, 2003). Collective-efficacy related to supportive principal behaviors of instructional modeling, support to individual teachers, and focus on school mission (Armstrong-Coppins, 2003; LeRoy, 2005; Tagger, 2002) and contributed to organizational commitment in mentoring relationships (Allen, 2003).

Relationship of Collective-Efficacy and Change Processes

Olivier (2001) identified collective-efficacy as the strongest predictor of school-organizational effectiveness. As schools worked to improve student outcomes through

teacher use of instructional innovations, information on the efficacious beliefs of the staff needed to be collected, examined, and analyzed to affect needed change. "Just as individual teacher-efficacy partially explains the effect of teachers on student achievement, from an organizational perspective, collective-efficacy helps to explain the differential effect that school cultures have on teachers and students" (Goddard, Hoy, et al., 2004, p. 4).

Hall and Hord (2006) indicated, "Even when the change is mandated, some individuals will delay implementation" (p. 7). They indicated that significant procedural differences exist between developing and implementing an innovation. Collective-efficacy beliefs of teachers impacted professional-learning environments and meaningful change efforts (Dellinger, 2001). Strong collective-efficacy of a group of teachers could interfere with reform processes (Collins, 2001). Therefore, it was critical that schools be responsive to the needs of teachers in this change process.

Collective-efficacy was important to teacher use of new innovations because it predicted the level of group effort and group performance (Lin, 2001). Furthermore, collective-efficacy impacted group goal development and goal commitment (Ross & Gray, 2004). Teachers with higher levels of collective-efficacy showed increased professional behaviors (Scott, 2003) and more effective decision-making skills (Tasa, 2002).

Hall and Hord (2006) indicated that mandated change could work, but organizational change could not occur until individuals within the organization changed. Individual teacher-implementation of research-based instructional practices was critical to student achievement, yet teachers were often perceived to be resistant to school

improvement efforts. "Many educators feel that it is not the quality of the innovation that is lacking; rather, this failure is due to our lack of knowledge about and attention to the process of change and the requirements for successful change" (Loucks, Newlove, & Hall, 1998, p. 1). School culture and norms might limit teachers' beliefs about their capacity to learn and perform at high levels (Johnson & Donaldson, 2007) and thus impact negatively on student achievement. It is important that levels of collective-efficacy could be altered to improve the professional learning-community of a school (Garcia, 2004).

Collective-Efficacy Instrumentation

The two primary approaches were recognized in the examination of organizational collective-efficacy. Bandura (1997) indicated that the selection of either instrumentation type largely depended on the nature of the organization that is being examined. The selection of methods depended on the load assigned to individual or interdependent factors of the organization.

If the organizational connections between individuals were intermittent or marginal, Bandura referred to this relationship structure as "loose coupling." In such cases, the aggregation of individuals' measures might provide the appropriate means to measure collective-efficacy. In organizations where interdependent group relationships between individuals were required, a tighter coupling approach may be warranted. In this type of instrumentation, "we" statements, rather than "I" statements, were used. Bandura (2000) indicated, "The relative predictiveness of the two indices of collective efficacy will largely depend on the degree of interdependent effort needed to achieve desired results" (p. 77).

Summary

This chapter provided a summation of the theoretical base for Social Cognitive Theory that underscored the importance of collective-efficacy research in schools. Despite the ongoing debates over construct definitions for self-concepts such as efficacy, esteem, and confidence, research in this field was critical to the change process that was needed to increase student achievement. Bandura (2001) noted, "High efficacy schools accept responsibility for their students' outcomes. Teachers in schools with high collective-efficacy do not accept low student achievement as an inevitable byproduct of low socioeconomic status, lack of ability, or family background" (p. 5).

Continued research involving the connections between teachers' sense of collective-efficacy and student achievement was essential (Smith, Hoy, & Sweetland, 2002). Connections between collective-efficacy and other factors that may have direct and indirect impacts on achievement, such as conditions with vocational-technical school settings, were equally important to identify.

Malloch (1999) indicated,

There is a need for quality research into vocational education and training which will assist in creating more organizations and workplaces where recognition of complexity, visionary leadership, excellent management behaviour, the presence of a learning culture, the nature of the organization, and appropriate reward systems operate on a daily basis. (p. 7)

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this study was to determine the relationship between collective-efficacy beliefs and student achievement in vocational-technical high-school settings. This chapter describes and justifies the research design and research approach of the study. Variables are defined. Characteristics of the sample, sampling methods, and sampling size are addressed. The instrumentation type, instrument description and assessment, administration, scoring procedures, and location of raw data are included. This chapter also includes an initial discussion of the descriptive analysis of the data. A discussion of how participants' rights were protected is also addressed.

Identification of Variables

This study investigated the relationship between two variables: collective-efficacy and student achievement. Collective-efficacy was measured at the school level. Student achievement was collected in the areas of mathematics, reading, science, and interdisciplinary writing at the school level.

Participants

Population and Sample for the Independent Variable

The purpose of this study was to measure the effects of collective-efficacy from a teacher perspective. Therefore, teachers from 17 vocational-technical high schools were selected to participate in this study. Data were obtained from teachers across all academic and trade departments, resulting in a sample of 730 participants.

Population and Sample for the Dependent Variables

To determine student achievement, the aggregated scores of Grade 10 students were calculated for those Grade 10 students who took the standard version of the Connecticut Academic Performance Test. Student scores were obtained in all schools from which the independent variable sample is derived. Ninety-nine percent of Grade 10 students participated in the study.

Sample Selection

To determine the level at which the results were biased due to student-, teacher-, or school-based factors, skewness and kurtosis measures were undertaken. Furthermore, achievement comparisons between the 5 Title 1 schools and 12 non-Title 1 schools were examined through analysis of variance for reading, writing, mathematics, and science. Title 1 schools were identified through parameters set by Title 1 Section 101: Improving the Academic Achievement of the Disadvantaged (No Child Left Behind Act, 2001). Under this act, school districts target the Title 1 funds to their schools with the highest percentages of children from low-income families. The five schools in this district that

qualified for Title 1 funds met the requirement that at least 40% of the enrolled students were from low income families.

Additionally, it is important to note that the samples were uniform in several areas. The following list indicates universal characteristics evidenced across all 17 schools in the district that contributed to strong variable controls:

1. Every teacher in the district was required to use a universal lesson plan format that includes critical teaching behaviors of advance organizers, schema activators, post-organizers, flexible grouping strategies, explicit instruction, and student-outcome-based objectives and assessments (see Appendix A).
2. Every teacher received professional development in the form of coaching and workshops in the areas of instruction, behavior management, and school climate.
3. All academic and trade courses were taught based on an explicit curriculum that is used across schools to ensure integrity of content acquisition. All schools offered the same academic courses and trade clusters (see Appendix B).
4. All teachers received universal resources for teaching and professional growth.
5. All teachers were certified in their assigned subject areas (see Appendix C).
6. All students were accepted into the school district based on universal criteria that includes academic achievement, behavior, and school attendance (see Appendix D).
7. All students received free transportation to the schools.
8. All schools had the same graduation policies and requirements (see Appendix E).

9. All students had access to the schools from at least three surrounding towns or cities. None of the schools drew only from local education agencies that qualified for Title 1 funds.

Instrumentation

This study used two instruments for data collection. The independent variable of collective-efficacy was measured through use of the Collective Teacher-Efficacy Belief Scale (CTEBS). The dependent variable was measured on the Connecticut Academic Performance Test (CAPT). A comprehensive description of the concepts each test measured, how scores were calculated and interpreted, reliability and validity, and administration processes are included in this section.

Collective Teacher-Efficacy Belief Scale (CTEBS)

Instrument Selection

The Collective Teacher-Efficacy Belief Scale (CTEBS) measured collective-efficacy at a group level. This scale was an adaptation of the Teacher Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001). Given the interdependent nature of instructional tasks, the group orientation of this instrument was appropriate. Additionally, this instrument was designed for specific application in teacher-efficacy research, thus making it appropriate for use in this study.

Instrument Description

The CTEBS provided a questionnaire format. It included 12 items and contains two subsets of collective-efficacy: instructional strategies and group discipline. Teachers

rate themselves on a 9-point Likert-like scale for each item. Appendix F provides a sample of this questionnaire.

Instrument Administration

For this study, the Collective Teacher-Efficacy Belief Scale was administered electronically. Participants accessed the instrument through the school district website. Written instructions for test completion were available at the top of the questionnaire. Participants completed the test through computer access in their classrooms. Raw data were compiled on the website and accessed through the secure central office administrative system.

Instrumentation Characteristics

Test developers Tschannen-Moran and Barr (2004) indicated,

In factor analysis, the 12 items loaded on one factor, with factor loadings that ranged from .79 to .58. When the two factors were specified, the rotated factors divided along the predicted content, with factor loadings on the 6 items in the instructional strategies subscale ranging from .78 to .67 and the 6 items in the student discipline subscale ranging from .78 to .64. (p. 188)

This instrument showed instructional-strategy-subscale reliability of .94, student-discipline-subscale reliability of .96, and the 12-item scale demonstrated reliability of .97.

Connecticut Academic Performance Test

Instrument Selection

The Connecticut Academic Performance Test (CAPT) was used to determine student achievement. Section 10-14n of the Connecticut General Statutes requires all students in the public schools in Grade 10 to participate in this state assessment. The

selection of this measure to collect data on the independent variable was based on its use in accountability processes in statewide education.

Instrument Description

The CAPT measured student achievement in four content areas: Mathematics, Science, Reading Across the Disciplines (based on a Response to Literature test and a Reading for Information test), and Writing Across the Disciplines (based on two Interdisciplinary Writing tests and an Editing & Revising test). The CAPT assessed student knowledge and skills in each content area based on the Connecticut curriculum frameworks. Appendix G provides the rationale for CAPT administration.

Student results were reported in five performance categories: Advanced, Goal, Proficient, Basic, and Below Basic for each academic area. Appendix H provides specifications for proficiency levels in each CAPT test area.

Instrument Administration

The CAPT was administered through a rigorously controlled process. The specific testing dates, length of testing sessions, and administration procedures were set at the state level and were uniform across districts.

Students independently completed each test component through prescribed procedures specific to each given test. Each test was administered in a regular classroom setting, and a test monitor assured administration integrity. The four tests were administered on separate test dates and were completed within prescribed time allotments. Appendix I provides specific CAPT administration information.

Instrumentation Characteristics

As described in the CAPT information site of the Connecticut State Department of Education website, scale scores ranging from 100 to 400 were generated for each of the content areas: Mathematics, Science, Reading Across the Disciplines, and Writing Across the Disciplines. The scale-scores were associated with a performance level (i.e., below-goal, goal, advanced, proficient).

Null Hypotheses

For statistical analysis purposes, I created four null hypotheses generated from my research questions. The following hypotheses were established for my study:

Null Hypothesis 1

Academic performance on the Mathematics Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 2

Academic performance on the Science Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 3

Academic performance on the Reading for Information Test of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 4

Academic performance on the Writing Across the Disciplines Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Data Analysis

This section provides an explanation of the research procedures reported in chapter 4. As preliminary statistical analyses, I executed descriptive statistics on all variables in the study. I calculated the mean scores and standard deviations on the dissertation variables and reported on each. Then I undertook the primary statistical analyses.

I conducted six separate analyses of variance to address possible issues of bias related to school profile differences. The criterion or dependent variables (Y) were the four academic performance measures (Math, Writing, Science, and Reading) and the two factors of collective-efficacy (Instruction and Discipline). The predictor or independent variables (X) included schools categorized as Title 1 and non-Title 1 status.

I conducted four separate multiple regression analyses to address the four null hypotheses. The criterion or dependent variables (Y) were each of the four academic performance measures (Math, Writing, Science, and Reading). The vector of predictor variables was the two subscales of the Collective Efficacy test and the Total Score. Specifically, these were the Instructional subscale (X1), the Discipline subscale (X2), and the Total Score (X3). All of the three were independent or predictor variables.

Given the a posteriori research process, I used statistical criteria to build a subset of predictors. I executed the four multiple regression procedures in a stepwise procedure where the predictor variable that explained the most variance in the dependent variable emerged first, and then subsequent variables were entered into the regression equation.

My use of regression as the method of analysis was based on key assumptions of linearity of relationships, fixed X variable, lack of measurement errors, and lack of specification errors (Pedhazur, 1982). I assumed linearity through the connection of variable relationships to Social Cognitive Theory and past research (as addressed in the literature review). The reliability measures established for the X and Y variable tests supported a lack of measurement errors. I viewed specification errors as minimal in that linear relationships assumed in this research model were supported through Social Cognitive Theory and included variables appropriate to tests of that theory. Normality was established through tests of skewness and kurtosis. Conversely, I assumed that some level of inter-collinearity would occur since the predictor variables were subsets of one test instrument, thus impacting the findings.

I conducted a factor analysis using the collective-efficacy data to respond to the inter-collinearity determined through the Pearson Product-Moment Correlations. The

original factor analysis of the CTEBS was completed to validate the components and total test instrument by determining the clusters under which each variable was related. I executed this statistical procedure as a confirmatory measure to assure that each test item corresponded with the components established through the original test development. I completed the factor extraction through Principal Component Analysis. The KMO and Bartlett's test of sphericity determined normality of the sample and the adequacy of the variables for use in the factor analysis. I used the Varimax with Kaiser Normalization method to rotate the factors. Rotation of the factors converged in three rotations. In keeping with the assumptions of multiple linear hypothesis, the data were linear, interval, and contained relevant variables.

Availability of Raw Data

Raw data for each test administration are available upon request. Secondary data obtained through the school system were used in this study.

Participant Rights Protection

I applied for and received approval to conduct this study through the Andrews University Human Subjects Review Board. The data were collected by the district and were independent of the intended research of this study. The data for the dependent and independent variables were part of ongoing research to evaluate professional development at each school. Confidentiality was maintained in that actual school names associated with each school code did not disclose the teacher or student population and sample descriptions.

CHAPTER 4

RESULTS

Introduction

The purpose of my study was to explore the relationship between collective-efficacy beliefs of teachers and student achievement. I examined the collective-efficacy beliefs of academic and trade teachers in 17 Connecticut technical high schools and the relationship between those beliefs to student achievement on the Connecticut Academic Performance Test. My study sought to determine relationships between (a) teachers' overall perceptions of collective-efficacy and student achievement, (b) teachers' perceptions of their collective instructional efficacy to student achievement, and (c) teachers' perceptions of their collective discipline efficacy to student achievement. For each collective-efficacy domain, I explored the relationships to mathematics, science, reading, and writing achievement. In this chapter, I provide sample descriptions, collective-efficacy data, student achievement data, tests of the hypotheses, discussion of the findings, and a summary.

Description of the Samples

Collective-Efficacy Sample

I collected collective-efficacy data from teachers in all 17 high schools in the technical high-school district. Data were obtained from teachers across academic and

trade departments. Seven hundred thirty teachers served as subjects in the study, and this number represented 71% of the total teaching staff. Table 1 reports the schools from which the teachers were drawn and the respective numbers of teachers from each school. Since the teachers completed the collective scale voluntarily and without a requirement for content-area disclosure, a specific ratio of trade and academic teacher participation could not be determined.

To determine collective-efficacy, I collected teachers' scores on the Collective Teacher-Efficacy Belief Scale (CTEBS). Rated on a 9-point Likert-like scale, the 12 items on the CTEBS produced two scale scores: Instructional Strategies (Instruction) and Group Discipline (Discipline).

Student Achievement Sample

I collected achievement scores for Grade 10 students across the 17 schools in the areas of mathematics, science, reading, and writing. For each of the four test areas, the number of participants across the schools ranged from 99.3 to 99.6% of the total population of 2,592 students. Students who did not take this test were exempt through No Child Left Behind parameters for English Language Learners and special education. Table 2 represents this information.

To determine student achievement, I accessed the scaled scores (100-400) on the Connecticut Academic Performance Test (CAPT). The CAPT measured student achievement in four content areas: Mathematics, Science, Reading Across the Disciplines (based on a Response to Literature test and a Reading for Information test), and Writing Across the Disciplines (based on two Interdisciplinary Writing tests and an Editing & Revising test).

Table 1

Number of Teachers by Participating School

Participating schools (coded)	Number of teacher subjects/total teachers in the school	Percentage of teacher subjects from the school	Percentage of total teacher sample in the study
1	70/79	89	10
2	33/59	56	4
3	21/51	41	3
4	58/65	89	8
5	59/76	78	8
6	40/51	78	6
7	51/70	73	7
8	22/57	39	2
9	42/51	82	6
10	42/51	82	6
11	22/40	55	3
12	50/68	74	7
13	44/65	68	6
14	43/53	81	6
15	40/50	80	5
16	34/70	49	5
17	59/65	91	8
Total	730/1,021	71	100

Table 2

Number of Students by Participating School

School	Total student population	Science	Math	Reading	Writing
1	238	238	237	237	238
2	139	139	139	138	138
3	163	162	161	162	163
4	136	133	130	132	132
5	144	141	141	140	140
6	141	140	141	141	140
7	164	164	164	164	163
8	142	142	142	141	140
9	136	134	133	135	133
10	109	109	109	109	109
11	65	65	63	63	63
12	183	183	183	183	183
13	190	189	188	189	189
14	124	124	124	124	124
15	142	142	142	142	142
16	207	207	207	207	207
17	169	169	169	169	169
Total	2,592	2,581	2,573	2,576	2,573
Percentage		99.6	99.3	99.4	99.3

Hypotheses

The following hypotheses were established for this study. Stated as null hypotheses, they were as follows:

Null Hypothesis 1

Academic performance on the Mathematics Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 2

Academic performance on the Science Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 3

Academic performance on the Reading for Information Test of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Null Hypothesis 4

Academic performance on the Writing Across the Disciplines Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of

scores consisting of Collective Efficacy Instructional Subscale, the Collective Efficacy Discipline subscale, or the Total Score on Collective Efficacy.

Preliminary Statistical Analysis

I executed two preliminary statistical processes to prepare the data for multiple regression analysis. First, I collected descriptive statistics on the collective-efficacy and achievement variables. Second, I executed Pearson Product-Moment Correlations to determine the relationship between predictor variables (CTEBS Instruction, CTEBS Discipline, and CTEBS Total Score) and each of the respective criterion variables (CAPT Mathematics, Science, Reading and Writing). Finally, I conducted a confirmatory factor analysis of the CTEBS to explore and respond to the inter-collinearity illustrated through the second procedure.

Collective-Efficacy Variables

I collected descriptive statistics on the three independent variables of this research. As reported in Table 3, I included the means and standard deviations for the 12 items on the CTEBS, the CTEBS Instructional Strategies Subscale, the CTEBS Group Discipline Subscale, and the CTEBS Total score.

The results indicated a normal population as noted in Table 4. Skewness and kurtosis measures for the Instruction Scale Score, Discipline Scale Score, and Total Score indicated normality of the sample for each test domain as all scores fell between ± 1 , and all standard error measures were low.

Table 3

Descriptive Statistics on Collective-Efficacy Variables

CTEBS variables	Mean	Standard deviation
Item 1 instruction	7.87	1.2
Item 2 instruction	7.59	1.3
Item 3 discipline	7.85	1.3
Item 4 discipline	7.60	1.5
Item 5 instruction	7.34	1.3
Item 6 instruction	7.41	1.4
Item 7 discipline	6.58	1.7
Item 8 discipline	6.83	1.7
Item 9 instruction	7.37	1.3
Item 10 discipline	6.84	1.6
Item 11 instruction	7.24	1.5
Item 12 discipline	7.77	1.3
Instruction subscale	44.83	6.5
Discipline subscale	43.47	7.1
Total score	88.30	12.6

Table 4

Collective-Efficacy Sample Normality Descriptors

Descriptor	Instruction scale score	Discipline scale score	Total score
Skewness	-.670	-.741	-.678
Std. error of skewness	.090	.090	.090
Kurtosis	.493	.564	.558
Std. error of kurtosis	.181	.181	.181

To further isolate the boundaries of my results, I conducted two analysis of variance tests (ANOVAs) to determine the impact of socioeconomic status of schools on teacher perceptions of collective-efficacy. I compared collective teacher-efficacy at Title 1 and non-Title 1 schools in instruction and discipline. Tables 5 and 6 indicate the results of my findings.

The results indicated no significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 5. The F ratio of 4.318 provided a p value significance of .055 at the alpha level of .05, which indicated that the score fell just outside the range of significant influence. These results indicated that Title 1 school identification on the collective efficacy perceptions of student achievement is not significant.

The results indicated a significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 6. The F ratio of 10.832 provided a p value significance of .005 at the alpha level of .05 and indicated a significant influence of Title 1 school identification on the collective-efficacy perceptions around student discipline.

Table 5

ANOVA Title 1 Relationship to Collective-Efficacy Beliefs on Instruction

			<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>Sig.</i>
Instruction Title 1	Between groups	Combined	9.896	1	9.896	4.318	.055*
	Within groups		34.376	15	2.292		
	Total		44.273	16			

* $p < .05$.

Table 6

ANOVA Title 1 Relationship to Collective-Efficacy Beliefs on Discipline

			<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>Sig.</i>
Instruction Title 1	Between groups	Combined	32.282	1	32.282	10.832	.005*
	Within groups		44.705	15	2.980		
	Total		76.987	16			

* $p < .05$.

Academic Performance Variables

I collected descriptive statistics on the four dependent variables of this research. As reported in Table 7, I determined and reported the means and standard scores for the Mathematics, Science, Reading, and Writing components of the CAPT.

The findings indicated population normality as reported in Table 8. Skewness and kurtosis measures for Math, Science, Reading, and Writing indicated normality of the sample for each test domain as all scores fell between +/- 1, and all standard error measures were low.

Table 7

Means and Standard Deviations on Achievement Variables

CAPT variables	Mean	Standard deviation	Range
Mathematics	237.56	15.1	210.7 - 254.9
Science	234.73	16.3	200.9 - 251.1
Reading	233.10	11.2	206.9 - 248.8
Writing	231.24	8.5	208.2 - 247.1

Table 8

Achievement Sample Normality Descriptors

	Math	Science	Reading	Writing
Skewness	-.841	-.842	-.575	-.414
Std. error of skewness	.090	.090	.090	.090
Kurtosis	-.547	-.740	-.614	.126
Std. error of kurtosis	.181	.181	.181	.181

To further define the parameters of my results, I conducted four analysis of variance tests (ANOVAs) to determine the impact of socioeconomic status of schools on achievement. These findings provided supplemental information about my research outcomes. Five of the 17 schools were identified as "Title 1" status based on the free and reduced lunch count at each of those schools. I compared student achievement at Title 1

and non-Title 1 schools in reading, writing, science and mathematics. The following tables indicate the results of my findings.

The results indicated a significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 9. The F ratio of 7.547 provided a p value significance of .000 at the alpha level of .05. The results indicated a significant influence of Title 1 school identification on the achievement results in mathematics.

The results indicated a significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 10. The F ratio of 91.068 provided a p value significance of .000 at the alpha level of .05 and indicated a significant influence of Title 1 school identification on the achievement results in science.

The results indicated a significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 11. The F ratio of 27.141 provided a p value significance of .000 at the alpha level of .05 and indicated a significant influence of Title 1 school identification on the achievement results in reading.

Table 9

ANOVA Title 1 Relationship to CAPT Mathematics Performance

			SS	df	MS	F	Sig.
Math Title 1	Between	Combined					
	groups		2814.697	1	2814.697	7.547	.000*
	Within						
	groups		887.972	15	59.198		
	Total		3702.669	16			

* $p < .05$.

Table 10

ANOVA Title 1 Relationship to CAPT Science Performance

			<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	Sig.
Science Title 1	Between groups	Combined	4009.904	1	4009.904	91.068	.000*
	Within groups		660.479	15	44.032		
	Total		4670.382	16			

* $p < .05$.

Table 11

ANOVA Title 1 Relationship to CAPT Reading Performance

			<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	Sig.
Reading Title 1	Between groups	Combined	1468.320	1	1468.320	27.141	.000*
	Within groups		811.485	15	54.099		
	Total		2279.805	16			

* $p < .05$.

The results indicated a significant difference in mean scores between Title 1 and non-Title 1 schools, as noted in Table 12. The F ratio of 12.801 provided a p value significance of .003 at the alpha level of .05 and indicated a significant influence of Title 1 school identification on the achievement results in writing.

Despite the homogeneous criteria for student entry into the school district, the common curriculum and curriculum assessments across schools, and standard teacher

Table 12

ANOVA Title 1 Relationship to CAPT Writing Performance

			<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>Sig.</i>
Writing Title 1	Between groups	Combined	695.063	1	695.063	12.801	.003*
	Within groups		814.467	15	54.298		
	Total		1509.529	16			

* $p < .05$.

certification for subject matter instruction, the effects of socioeconomic status on these findings are noteworthy and limit the generalizability of these findings. The results, however, confirm the impact of socioeconomic status on student achievement.

Pearson Product-Moment Correlations

I executed a second preliminary statistical procedure. Because the primary statistical procedure was a multiple regression, I calculated Pearson Product-Moment Correlations to determine the relationship between predictor variables (CTEBS Instruction, CTEBS Discipline, and CTEBS Total Score) and each of the respective criterion variables (CAPT Mathematics, Science, Reading, and Writing). In Table 13, I report the inter-correlations among all variables.

Results showed positive correlations across all variable measures. All of the Pearson Product-Moment Correlations were statistically significant at the .05 level; these results may have been based partly on a large sample size of 730 subjects. To determine if the results were biased by the large sample, I also ran the statistics at the .01 level. The

Table 13

Inter-correlations of Predictor and Criterion Variables

	CTEBS instruction	CTEBS discipline	CTEBS total score
Math	.08**	.15**	.12**
Science	.11**	.17**	.15**
Reading	.16**	.17**	.18**
Writing	.13**	.12**	.13**
CTEBS instruction	1.00	.70**	.92**
CTEBS discipline	.70**	1.00	.93**
CTEBS total score	.92**	.93**	1.00

* $p < .05$. ** $p < .01$.

results were significant at this level. In viewing correlations between collective-efficacy and achievement, the positive correlations suggested that teachers with higher collective-efficacy scores were found at schools with higher CAPT scores. Teachers with lower collective-efficacy scores were found at schools with lower CAPT scores.

Predictor variables should have low correlations with each other but high correlations with the criterion variable. In the case of this dissertation research, the predictor variables were highly inter-correlated. The CTEBS Instruction and the CTEBS Discipline Subscales had a high and positive correlation of .70 (r). Each was highly correlated with the Total Score. The CTEBS Instruction Subscale was correlated .92 (r) with the CTEBS Total Score. The CTEBS Discipline Subscale was correlated .93 (r) with

the Total Score. These results signified that one of the three predictor variables would likely emerge as a singular predictor since variance among the three was shared.

As a precautionary and confirmatory measure, I conducted a factor analysis of the collective-efficacy data in response to the inter-collinearity of those data. The extraction method used was Principal Component Analysis, and the rotation method was completed through Varimax with Kaiser Normalization. The rotation was completed in three iterations. Two components were recognized as relevant factors since all other components had an eigenvalues of less than 1.0 (indicating that the variance accounted for less than for the original variable). The two components accounted for 64% of the variance as illustrated in Table 14.

Table 14

CTEBS Total Variance Explained

Component	<u>Initial eigenvalues</u>			<u>Rotation sums of squared loadings</u>		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.580	53.817	53.817	4.226	35.220	35.220
2	1.247	10.393	64.210	3.479	28.989	64.210
3	0.797	6.640	70.850	-	-	-
4	0.691	5.755	76.604	-	-	-
5	0.541	4.507	81.112	-	-	-
6	0.470	3.916	85.028	-	-	-
7	0.416	3.468	88.496	-	-	-
8	0.352	2.937	91.433	-	-	-
9	0.311	2.588	94.021	-	-	-
10	0.297	2.477	96.498	-	-	-
11	0.258	2.151	98.498	-	-	-
12	0.162	1.351	100.000	-	-	-

As illustrated in Table 15, each item except Item 3 of the CTEBS loaded most heavily on the factors of Instruction (Component 1) and Discipline (Component 2) set forth by the test developer. A value of .4 or higher is considered adequate for loading on a given factor. These results support the reliability of the data set as measured across the school district and the overall validity of the test instrument used.

The distribution of values was highly adequate for the use of factor analysis. The Kaiser-Mayer-Olkin (KMO) Test generated a score of .913. Based on Kaiser's interpretation, a score of $> .9$ is "marvelous" (SPSS, 2005, p. 256) and illustrated the level of distribution quality for this analysis.

Table 15

CTEBS Rotated Component Matrix

CTEBS variables	Component	
	1	2
Item 1 instruction	.752	.303
Item 2 instruction	.725	.297
Item 3 discipline	.577	.445
Item 4 discipline	.500	.571
Item 5 instruction	.849	.168
Item 6 instruction	.839	.205
Item 7 discipline	.239	.785
Item 8 discipline	.181	.865
Item 9 instruction	.743	.344
Item 10 discipline	.259	.783
Item 11 instruction	.533	.453
Item 12 discipline	.368	.634

Additionally, this table indicated the item relationship to the two measured collective-efficacy factors examined through this research: (a) instruction, and (b) discipline. Test developers Tschannen-Moran and Barr (2004) indicated that

in factor analysis, the 12 items loaded on one factor, with factor loadings that ranged from .79 to .58. When the two factors were specified, the rotated factors divided along the predicted content, with factor loadings on the 6 items in the instructional strategies subscale ranging from .78 to .67 and the 6 items in the student discipline subscale ranging from .78 to .64. (p. 188)

This instrument showed instructional-strategy-subscale reliability of .94, student-discipline-subscale reliability of .96, and the 12-item scale demonstrated reliability of .97.

Primary Statistical Analysis

I conducted four multiple regression analyses to address the four null hypotheses. The criterion or dependent variable (Y) was each of the four academic performance measures (Math, Science, Reading, and Writing). The vector of predictor variables was the two subscales of the Collective Efficacy test (Instruction and Discipline) and the Total Score. Specifically, these were the Instructional subscale (X1), the Discipline subscale (X2), and the Total Score (X3). All of the three were independent or predictor variables.

Given the high inter-correlation between predictors, I executed the four multiple regression procedures in a stepwise procedure in which the predictor variable that explained the most variance in the dependent variable emerged first, and then subsequent variables entered the regression equation.

Hypothesis Testing

Null Hypothesis 1

Null Hypothesis 1: Academic performance on the Mathematics Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of CTEBS Instructional subscale, the CTEBS Discipline subscale, or the Total Score on the CTEBS.

The first null hypothesis was tested and rejected through use of a stepwise multiple regression. The independent variables were the Instructional and Discipline subscales of the CTEBS and the Total Score. The results as shown in Table 16 documented that the Discipline subscale of the CTEBS was the most effective predictor of the Mathematics CAPT score. The high inter-correlations among the predictor variables accounted for this result; only one predictor variable emerged (Discipline subscale). A multiple R of .145 was obtained which accounted for 2% of the variance. The generated regression equation was as follows:

$$\text{Math CAPT Score } (\hat{Y}) = .31 (\text{Discipline Score}) + 224.$$

Table 16

Hierarchical Regression Analysis of a Set of Predictor Variables Explaining the Variance in Mathematics Score on the CAPT (N=730)

Independent variable	Multiple R	R^2	Adj. R^2	F	Sig.
Discipline subscale	.145	.021	.020	15.56	.000*

* $p < .05$. ** $p < .01$.

Null Hypothesis 2

Null Hypothesis 2: Academic performance on the Science Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of CTEBS Instructional subscale, the CTEBS Discipline subscale, or the Total Score on the CTEBS.

The second null hypothesis was tested and rejected through use of a stepwise multiple regression. The independent variables were the Instructional and Discipline subscales of the CTEBS and the Total Score. The results in Table 17 document that the Discipline subscale of the CTEBS was the most effective predictor of the Science CAPT score. The high inter-correlations among the predictor variables accounted for this result; only one predictor variable emerged. A multiple R of .168 was obtained which accounted for 2.8% of the variance. The generated regression equation was as follows:

$$\text{Science CAPT Score } (\hat{Y}) = .38 (\text{Discipline Score}) + 218.$$

Table 17

Hierarchical Regression Analysis of a Set of Predictor Variables Explaining the Variance in Science Score on the CAPT (N=730)

Independent variable	Multiple R	R^2	Adj. R^2	F	Sig.
Discipline subscale	.168	.028	.027	21.09	.000*

* $p < .05$. ** $p < .01$.

Null Hypothesis 3

Null Hypothesis 3: Academic performance on the Reading Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of CTEBS Instructional subscale, the CTEBS Discipline subscale, or the Total Score on the CTEBS.

The third null hypothesis was tested and rejected through use of a stepwise multiple regression. The independent variables were the Instructional and Discipline subscales of the CTEBS and the Total Score. The results in Table 18 document that the Total Score of the CTEBS was the most effective predictor of the Reading CAPT score. The high inter-correlations among the predictor variables accounted for this result; only one predictor variable emerged. A multiple R of .178 was obtained which accounted for 3.2% of the variance. The generated regression equation was as follows:

$$\text{Reading CAPT Score } (\hat{Y}) = .16 (\text{Total Score}) + 219.$$

Table 18

Hierarchical Regression Analysis of a Set of Predictor Variables Explaining the Variance in Reading Score on the CAPT (N=730)

Independent variable	Multiple R	Adj. R^2	Adj. R^2	F	Sig.
Total score on the CTEBS	.178	.032	.030	23.91	.000*

* $p < .05$. ** $p < .01$.

Null Hypothesis 4

Null Hypothesis 4: Academic performance on the Writing Component of the Connecticut Academic Performance Test (CAPT) cannot be predicted by a vector of scores consisting of CTEBS Instructional subscale, the CTEBS Discipline subscale, or the Total Score on the CTEBS.

The fourth null hypothesis was tested and rejected through use of a stepwise multiple regression. The independent variables were the Instructional and Discipline subscales of the CTEBS and the Total Score. The results, as evidenced in Table 19, document that the Discipline subscale of the CTEBS was the most effective predictor of the Writing CAPT score. The high inter-correlations among the predictor variables accounted for this result; only one predictor variable emerged. A multiple R of .130 was obtained which accounted for 1.7% of the variance. The generated regression equation was as follows:

$$\text{Writing CAPT Score } (\hat{Y}) = .09 (\text{Total Score}) + 224.$$

Table 19

Hierarchical Regression Analysis of a Set of Predictor Variables Explaining the Variance in Writing Score on the CAPT (N=730)

Independent variable	Multiple R	R^2	Adj. R^2	F	Sig.
Total score on the CTEBS	.130	.017	.015	12.46	.000*

* $p < .05$. ** $p < .01$.

Summary

In this chapter, I provided an explanation and summation of the study findings. First, descriptive statistics illustrated the population characteristics for both independent and dependent variable samples. Teacher and student samples were large in number. Teacher responses to the Collective Efficacy Belief Scale totaled 730 and represented 71% of the total district-wide teaching staff. Student achievement scores represented over 98% of the 1,273 student population of the district.

Next, I explained preliminary statistical analyses. Descriptive statistics on the collective-efficacy variable provided means and standard deviations for all CTEBS items, Discipline and Instruction Subscales and Total Test. These results indicated normality of the distribution. Descriptive statistics on the achievement variable provided means and standard deviations for CAPT Math, Science, Reading, and Writing. Heterogeneity of the distribution was determined through analyses of variance between Title 1 and non-Title 1 schools in CAPT Mathematics, Science, Reading, and Writing and through analyses of variance in CTEBS Instruction and Discipline factors. Pearson Product-Moment Correlations were then conducted to determine the relationship between predictor variables (CTEBS Instruction, CTEBS Discipline, and CTEBS Total Score) and each of the respective criterion variables (CAPT Mathematics, Science, Reading, and Writing). My analysis of the results explained the correlation relationships between the variables. Positive correlations were evidenced between each predictor variable and each criterion variable. High degrees of inter-correlation between predictor variables were discussed. Inter-correlations ranged from .70 (*r*) to .93 (*r*). To support the validity of findings, inter-collinearity of CTEBS components was addressed through confirmatory

factor analysis. Results showed that all but one item fell within expected domains of instruction and discipline based on the original factor analysis established in test construction.

Third, I described primary statistical analyses. I conducted four Multiple Regression analyses to address each of the four null hypotheses. I provided the rationale for use of a stepwise procedure. Given the inter-collinearity of the predictor variables, one predictor variable emerged as a singular predictor in each case.

Hypothesis testing resulted in my rejection of all four null hypotheses. Achievement in math and science were most effectively predicted by the collective teacher beliefs around school discipline. Reading and writing achievement were most effectively predicted by the overall perceptions of teachers' collective-efficacy.

CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

School leaders face daunting challenges in the provision of services that enhance student learning. Student achievement is dependent on quality teaching, yet many educators appear resistant to learning and applying innovative instructional approaches. Additional research is needed to determine how teachers learn new instructional approaches and on the work conditions that impact teacher acquisition of new skills (Elmore et al., 1996; Pajares, 1996). Perceived collective-efficacy was one factor that impacts teacher instructional decisions (Tschannen-Moran & Barr, 2004). School leaders needed to consider the power of efficacious beliefs as they attempt to reform school practices.

My study provides new information on the relationship between collective-efficacy and student achievement within the context of vocational-technical high-school settings. Although the direct relationship between collective-efficacy and student achievement had been established in traditional school settings (Bandura, 2001), the predictive value of collective-efficacy to aspects of student achievement in vocational-technical high schools was not well documented in the literature (Vaz, 2006).

Purpose of the Study

The purpose of my study was to examine the relationship between collective-efficacy beliefs of teachers and student achievement. The study is important to school leaders because it contributes information about teaching beliefs and practices that may impact student learning outcomes. I examined the collective-efficacy beliefs of academic and trade teachers in 17 Connecticut technical high schools and the relationship between those beliefs to student achievement on the Connecticut Academic Performance Test. My study determined relationships between (a) teachers' overall perceptions of collective-efficacy and student achievement, (b) teachers' perceptions of their collective instructional efficacy to student achievement, and (c) teachers' perceptions of their collective discipline efficacy to student achievement. For each collective-efficacy domain, I explored the relationships to mathematics, science, reading, and writing achievement.

This chapter provides a review of the research problem and associated research questions. Furthermore, this chapter addresses implications of the study, recommendations for future use, and conclusions.

Overview of the Literature Review

The literature review in chapter 2 identified key theories and studies relevant to the examination of collective-efficacy and student achievement. Founded in Social Cognitive Theory, the construct of efficacy had been studied in education and other social science areas, including physical and emotional health, team-building, career-building, and productivity. The sources of efficacious beliefs were derived from social, vicarious, physiological, or mastery learning experiences. This review identified studies illustrating

the relationship of efficacy to each domain. It described the underpinnings of Social Cognitive Theory and the relationship between theory constructs and ongoing research.

Social Cognitive Career Theory described an extension of Social Cognitive Theory. Social Cognitive Career Theory was discussed as it is used to explore academic pursuits and vocational decisions. The review of literature around vocational school settings was addressed. Few studies in vocational high-school settings were noted in the literature. Nonetheless, the impact of efficacious beliefs by educators in those settings contributed to student performance.

The literature on teacher-efficacy identified the relationship between self-efficacious beliefs and student outcomes. Teachers with high efficacious beliefs about their power to manipulate achievement outcomes were confirmed through a multitude of studies. Teacher-efficacy impacted student learning across all subjects and grade levels. Furthermore, the impact of administration support played a role in developing efficacious beliefs. This literature review identified the instrumentation developed to measure efficacious beliefs.

The literature on collective-efficacy in school settings described the impact of educators' collective-efficacy beliefs on student achievement. Collective-efficacy illustrated the perceptions of an educator about the joint control of the school membership around achievement and related factors such as discipline, school climate, and learning community. Collective-efficacy beliefs contributed to student achievement across all content areas and grade levels. The literature review described test instruments developed to measure the collective-efficacy beliefs of educators.

Research Questions

I addressed the following research questions:

1. Is there a relationship between the degree of perceived collective-efficacy and student achievement in mathematics?
2. Is there a relationship between the degree of perceived collective-efficacy and student achievement in science?
3. Is there a relationship between the degree of perceived collective-efficacy and student achievement in reading?
4. Is there a relationship between the degree of perceived collective-efficacy and student achievement in writing?

Research Design

In this study, I used multiple regression techniques to examine the relationships between collective-efficacy (independent variable) and student achievement (dependent variable). The sample I used to obtain data for the independent variable included teachers within academic and trade departments from 17 technical high schools. I measured the independent variable through use of a collective-efficacy questionnaire. Student achievement scores from the same schools provided my data for the dependent variable. I included the composite test scores for student achievement in science, math, writing, and reading on the Connecticut Academic Performance Test. I discussed specific instrumentation and statistical measures in chapter 3.

Summary of Findings

These results were confirmatory of previous research related to Social Cognitive Theory. Based on my research questions, the findings were as follows:

Research question 1: Is there a relationship between the degree of perceived collective-efficacy and student achievement in mathematics? A significant relationship between teacher perceptions of collective-efficacy and student achievement in mathematics was evidenced. Achievement in math was most effectively predicted by the collective teacher beliefs around school discipline.

Research question 2: Is there a relationship between the degree of perceived collective-efficacy and student achievement in science? A significant relationship between teacher perceptions of collective-efficacy and student achievement in science was evidenced. Achievement in science was most effectively predicted by the collective teacher beliefs around school discipline.

Research question 3: Is there a relationship between the degree of perceived collective-efficacy and student achievement in reading? A significant relationship between teacher perceptions of collective-efficacy and student achievement in reading was evidenced. Achievement in reading was most effectively predicted by the overall (combined instructional and behavioral) collective-efficacy beliefs of teachers.

Research question 4: Is there a relationship between the degree of perceived collective-efficacy and student achievement in writing? A significant relationship between teacher perceptions of collective-efficacy and student achievement in writing was evidenced. Achievement in writing was most effectively predicted by the overall (combined instructional and behavioral) collective-efficacy beliefs of teachers.

In summary, a significant relationship between teacher perceptions of collective-efficacy and student achievement in mathematics, science, reading, and writing was evidenced. Achievement in math and science was most effectively predicted by the collective teacher beliefs around school discipline. Reading and writing achievement was most effectively predicted by the overall perceptions of teachers' collective efficacy. Additionally, the results supported the relationship between socioeconomic status of schools and student achievement. Collective-efficacy beliefs about student discipline were lower at schools with lower socioeconomic status.

Conclusions and Implications

The major conclusions I drew from this study centered on the relationship between teacher beliefs, teaching practices, and student achievement. These conclusions have major implications for school leadership.

Conclusion 1: The findings supported the underpinnings of Social Cognitive Theory. Efficacious beliefs of teachers impact student achievement. The collective beliefs around efficacy of educators across a school are important for leaders to consider in developing safe, orderly, and productive learning communities within schools.

Conclusion 2: The perception of collective-efficacy pertaining to school discipline was a predictive factor in mathematics and science achievement at the secondary-school level. Control over discipline may be more valued than instructional control given the safety and managerial issues of students working with tools, knives, machines, and other dangerous elements at vocational schools. Leaders might explore how teacher assurance of disciplinary control may allow for greater time and concentration of efforts around instruction.

Conclusion 3: Instructional efficacy was not a significant factor in student achievement when measured without the mediating effects of behavioral efficacy perceptions. When combined with discipline beliefs, a significant relationship between overall perceptions of collective-efficacy and achievement in reading and writing were noted. School leaders might consider that a combination of instructional and behavioral supports is needed for teacher empowerment.

Conclusion 4: The socioeconomic status of students had a significant impact on student achievement and on the collective-efficacy beliefs of teachers around discipline.

Conclusion 5: The Collective-Efficacy Belief Scale met confirmatory factor analysis examination. All but one item loaded under expected components of Instruction and Discipline. The instrument might be used in further studies at vocational-technical high schools by leaders seeking out efficacy and achievement factors. However, given the inter-correlations obtained through the instrument, additional measures may be warranted.

Recommendations

I offer recommendations from this study for further research and for direct application of findings by leaders in vocational school settings.

Recommendations for Further Research

1. It is important to continue research that investigates the relationship of collective-efficacy to achievement in vocational school settings through qualitative and quantitative measures. Few studies have addressed the constructs of efficacy within the unique confines of a vocational school structure.

2. The efficacious beliefs of trade teachers might be examined in isolation to determine whether the beliefs of academic teachers in schools are different from those of teachers responsible for the vocational skill development of students. The factors around the development of efficacious beliefs for various teacher populations may provide important information for school leaders to use in addressing school reform efforts.

3. The efficacious beliefs of specific academic and trade departments might be examined to further define the conditions under which efficacious beliefs are developed. The implications of those beliefs around student achievement factors might be explored.

4. The efficacious beliefs around discipline might be examined through further research. The conditions under which teachers perceive strong efficacy around discipline may provide additional insights into the development of safe and orderly schools. Issues such as suspension/expulsion rates, detentions, and number of times students are sent out of class may need to be addressed if instruction is to be improved.

5. Additional research that measures the sources of collective-efficacy beliefs (social persuasion, mastery learning, vicarious experiences, physiological/emotional sources) in vocational settings may be warranted. Given the unique nature of these institutions, school leaders have few sources of information to assist in developing strong professional learning communities.

6. Additional studies that isolate school factors related to collective-efficacy might be addressed. School characteristics such as the impact of socioeconomic status, feeder school patterns, percentage of students with special needs coming from feeder schools, and other school characteristics might be considered.

7. Additional instruments that measure collective-efficacy within the context of vocational school settings may provide deeper insight into the factors that capture efficacious belief development and enactments.

Recommendations for School Leaders

As a result of this research, instructional leaders in vocational-technical high schools may apply new knowledge of the relationships between collective-efficacy and student achievement to create stronger professional learning environments in their schools.

1. Since teacher perceptions of collective-efficacy appear to have an impact on implementation of instructional pedagogy, it is important that school leaders actively seek out ways to measure and support such processes. Organizations might provide explicit opportunities for teachers and administrators to measure and develop their sense of efficacy and beliefs about student learning. Discrepancies between teachers' articulated beliefs and practices and their actual instructional performance could be noted and acted on by school leaders through appropriate, supportive measures.

2. School leaders need to develop strong work cultures in schools. In such environments, teachers are able to achieve school expectations for collegial, reflective practices related to instruction. In professional learning communities, teaching practices and beliefs about instruction become public. Therefore, efficacious beliefs are more readily addressed.

3. School discipline efforts and discussions with teachers around related administrative support, school practices, and consistency of communications may assist in building stronger levels of collective-efficacy. Since collective-efficacy beliefs around

discipline have a significant impact on achievement, it is important that school leaders build such beliefs that are integrated by the instructional and support staff of the school and within the school community itself. The provision of comprehensive professional development in professional learning communities, social skill development, and student behavior may contribute to these efforts.

4. Attention to the collective-efficacy beliefs of the larger school community is important to school leaders. Parents, community action groups, and other key supports to the schools might be invited to participate in activities and long-term processes that build collective-efficacy beliefs and instructional empowerment.

APPENDIX

APPENDIX A

CONNECTICUT TECHNICAL HIGH SCHOOLS LESSON PLAN

Guiding Questions for Lesson Plan Development

What are the important outcomes I want all students to learn as a result of this lesson?

What background knowledge/skills do students need to have to successfully master the lesson content?

What types of learning strategies, skills and modifications (reading, note taking, highlighting as you read, writing, listening, etc.) do students need to use to successfully participate in this lesson AND where in the lesson will the specific strategy be taught or reviewed?

What types of activities will I incorporate in my explicit direct teaching (modeling, small groups, brainstorming, activating prior knowledge, problem solving, etc.) to assure that ALL students' needs/interests/talents are met?

What are effective and appropriate ways (oral presentations, tests, reports, graphs, etc.) to evaluate how well students learned the objective?

Learning Objective:

Reference to Curriculum Goals(s) and Corresponding Learner Outcome (e.g., Goal I, L.O. I.2):

***Schema Activator** (activity designed to stimulate the student's interest and independent thinking about the learning topic; activates prior knowledge):

****Explicit/Direct Teaching Strategies:**

****Practice Activity:**

****Application/Assessment:**

***Closure:**

****Reflections based on student performance; necessary changes/modifications for future use:**

***Required for each lesson**

**** Dependent upon learning sequence within the unit.**

APPENDIX B

CONNECTICUT TECHNICAL HIGH SCHOOL SYSTEM COURSE OPTIONS

Connecticut Technical High School System Course Options

Technology Clusters

The cluster is the primary unit of organization at the Connecticut Technical High Schools. Utilizing the national definition of technology clusters, the six career clusters are as follows:

- I. Retail, Hospitality and Tourism Cluster
- II. Construction Cluster
- III. Manufacturing Cluster
- IV. Transportation Cluster
- V. Computer Technologies Cluster
- VI. Health Technology Cluster

Each technical program has a specific three-year program of study that outlines all academic and technical coursework required for students enrolled in that particular cluster. The career programs taught within each cluster are as follows:

I. Retail, Hospitality and Tourism Cluster

The Hospitality and Tourism Cluster is designed to create an appreciation of the service trades. Programs provide students with theoretical knowledge and skills for entry-level employment in the management, marketing and operation of restaurants, bakeries, lodging and travel-related services. Also included in this cluster are programs providing students with skills in hairdressing/barbering and fashion design. Graduates find employment in a wide variety of service occupations or continue their studies at post-secondary institutions.

Baking

Culinary Arts

Fashion Technology

Hairdressing/Barbering

Hotel/Hospitality Technology

Retail Management and Entrepreneurship

II. Construction Cluster

The Construction Cluster is designed to create an appreciation of the construction industry and develop entry level-skills within the industry. The program provides students with theoretical knowledge and skills for entry-level employment in the residential, commercial and industrial construction areas or in post-secondary institutions. Many opportunities for employment within the construction industry are available.

Architectural Technologies

Carpentry

Electrical

Heating Ventilation and Air Conditioning (HVAC)

Masonry

Plumbing and Heating

Plumbing, Heating and Cooling (Oliver Wolcott Tech only)

III. Manufacturing Cluster

The Manufacturing Cluster is comprised of interrelated industries that include the broad categories of manufacturing and assembling goods, drafting and design, machining and welding/fabrication. Many opportunities for employment and future professional development are possible within this cluster. Production planning and control, product and tooling design and manufacturing engineering are a few of the possible opportunities. Students also have the opportunity to continue their studies at postsecondary institutions.

Computer-Aided Drafting and Design

Electromechanical Technology

General Drafting and Design

Manufacturing Technology

Welding and Metal Fabrication

IV. Transportation Cluster

The Transportation Cluster prepares students to apply technical knowledge and skills in diagnostics, repair and maintenance of automotive and heavy-duty engines and equipment. Graduates enter the many opportunities for employment as automotive mechanics, diesel engine repair technicians, and in collision repair and refinishing. Students also have the opportunity to continue their studies at postsecondary institutions.

Automotive Collision, Repair and Refinishing

Automotive Technology

Diesel and Heavy Duty Equipment Repair

V. Computer Technologies Cluster

The Computer Technologies cluster prepares students to apply technical knowledge and skills designing, developing, managing and supporting hardware, software, multimedia and systems integration services. Also included in this cluster are programs providing training in electronics technology and graphic technology. Graduates enter a wide variety of high-technology positions or continue their studies at postsecondary institutions.

Electronics Technology

Graphics Technology

Information Systems Technology

Digital Microprocessor Technician (One Year Program only at Bristol Technical Education Center)

VI. Health Technology Cluster

The Health Technology Cluster is designed to provide a broad-based exposure and appreciation of health-related and early care and education occupations, as well as those in bioscience environmental technology. Programs provide students with theoretical knowledge and clinical skills in planning, managing and providing health care services, early care and education, and bioscience environmental technology research. Graduates may complete a competency credential or certification eligibility for entry-level employment in a variety of health-care settings or continue their studies at postsecondary institutions.

Bioscience Environmental Technology

Early Care and Education

Health Technology

DRAFT POWERED CURRICULA

Academic Offerings

Art
Career Development
Computer Education
English
Health Education
Library Media
Mathematics
Music
Physical Education
Science
Social Studies
World Languages

Technical Offerings

Architectural Technologies
Carpentry
Computer-Aided Drafting and Design
Culinary Arts
Early Care and Education
Electrical
Electronics Technology
Fashion Technology
Graphics Technology
Hairdressing and Barbering
Health Technology
Heating, Ventilation, and Air
Conditioning
Information Systems Technology
Manufacturing Technology
Masonry
Plumbing and Heating

APPENDIX C

TEACHER CERTIFICATION REQUIREMENTS AND APPLICATION

JOB OPENINGS for School Instructional and Support Staff

HOW TO APPLY

Complete and submit a State of Connecticut Employment Application.

Download and Print an application.

Form Application	Adobe Acrobat Version	If you want to download the Adobe Acrobat version and you do not have Adobe Acrobat Reader installed on your computer download the free Adobe Acrobat Reader .
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Attach the following:

Cover letter (letter of intent) and Resume
Completed CT Technical High School System application form
Proof of certification [See Certification Information](#).
Three current letters of reference
A Copy of College Transcripts

Persons applying for positions in the academic areas must hold a valid Connecticut certificate at the time of application.

We have changed our application requirements to be more consistent with the needs of our school system and our curriculum. **Please note that you must hold a valid Connecticut teaching certificate in order to be hired to teach in our school system.** Requirements for teacher certification include eight years of employment in the field for which the certificate is to be endorsed. This may include up to five years of apprenticeship, specialized schooling or college. A high school diploma from a technical high school may count for no more than two years of experience. We also require teachers to complete VTE 113: Intro. to Teaching Vocational-Technical Education and VTE 116: Teaching Vocational-Technical Education prior to teaching in our schools. These courses cover the basics of teaching pedagogy and classroom management. All courses are offered through Central Connecticut State University (CCSU), but will be held at the Institute of Technology and Business Development (ITBD) in downtown New Britain unless otherwise noted.

Conditions for Employment as an Instructor in the Construction Trades are that you must hold the appropriate contractor licenses including a minimum of a Class "C" Commercial Drivers License with "P&S" endorsements and a "V" restriction.

Connecticut Technical High School System
Professional Employment Application

Application for Instructor and School Administrator Positions
(Please type or print **legibly** in ink. Attach additional sheets as required.)

Thank you for your interest in the Connecticut State Department of Education, for its Technical High Schools. We invite outstanding educational leaders to apply for positions in our system. The Connecticut Technical High School system is a statewide system of 17 small high schools offering strong instruction in academics and a wide variety of trade technologies. A new administrative team is developing/implementing new curriculum in both academic and trade areas and providing intensive professional development. A new scheduling model offers school more flexibility and students more electives. The position offers a competitive starting salary and state benefits.

Name _____ Soc. Sec. No. _____ Date _____
(Last) (First) (MI)

Address _____
Street City State Zip

Telephone: Day: () _____ Eve: () _____ E-mail: _____

Position Applying For:

_____ Full-time Instructor Subject(s): _____
_____ Part-time Day Instructor Subject(s): _____
_____ Part-time Evening Instructor Subject(s): _____
_____ Coach Sport(s): _____
_____ Substitute Instructor Subject(s): _____
_____ Principal
_____ Assistant Principal

DEMOGRAPHIC INFORMATION (Voluntary): In order to meet state and federal reporting requirements, we request that you voluntarily supply the following information on gender and race. This data will not be used for discriminatory purposes and will not be considered in the evaluation of your application.

_____ F _____ American Indian/Alaskan Native _____ Caucasian
_____ M _____ Asian/Pacific Islander _____ Hispanic
_____ Black _____ Other, Specify: _____

YOUR ANSWERS TO THE FOLLOWING QUESTIONS ARE MANDATORY!

If you answer yes to questions 2, 3, OR 4, **explain on a separate sheet of paper and attach it to this application.** Provide information concerning the jurisdiction of the conviction, pending charges, approximate date, nature of conviction or charges or circumstances of dismissal.

1. Are you legally authorized to work in the U.S.?

_____ Yes _____ No

2. Have you ever been convicted of a felony or any other criminal offense, either within or outside of the State of Connecticut?

_____ Yes _____ No

3. Are any criminal charges currently pending against you, either within or outside of the State of Connecticut?

_____ Yes _____ No

SPECIAL NOTE: You are **not** required to disclose the existence of any arrest, criminal charge or conviction, the records of which have been erased pursuant to Connecticut General Statutes § 46b-146, 54-76o, or 54-142a. If your criminal records have been erased pursuant to one of these statutes, you may swear under oath that you have never been arrested. Criminal records that may be erased are records pertaining to a finding of delinquency or that a child was a member of a family with services needs (C.G.S. § 46b-146), an adjudication as a youthful offender (C.G.S. § 54-76o), a criminal charge that has been dismissed or nolle, a criminal charge for which the person has been found not guilty or a conviction for which the person received an absolute pardon (C.G.S. § 54-142a).

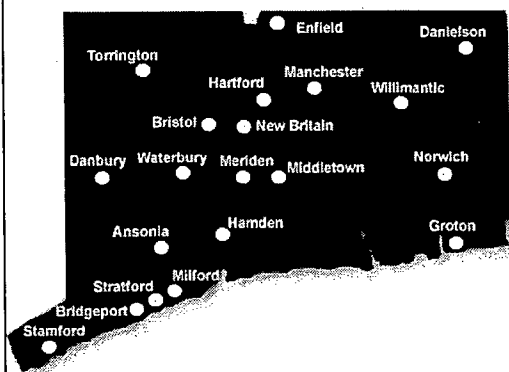
4. Have you ever been dismissed or discharged from a position?

_____ Yes _____ No

Please check the following schools you are interested in:

School Locator

Name of School	Location
Emmett O'Brien	Ansonia
Bullard Havens	Bridgeport
Bristol T.E.C.	Bristol
Henry Abbott	Danbury
H.H. Ellis	Danielson
Ella T. Grasso	Groton
Eli Whitney	Hamden
A.I. Prince	Hartford
Howell Cheney	Manchester
Cheney Satellite	Enfield
Stratford-Aviation	Stratford
H.C. Wilcox	Meriden
Vinal	Middletown
Platt	Milford
E.C. Goodwin	New Britain
Norwich	Norwich
J.M. Wright	Stamford
Oliver Wolcott	Torrington
W.F. Kaynor	Waterbury
Windham	Willimantic



CERTIFICATION/LICENSE INFORMATION:

Are you currently certified to teach in Connecticut? ____ Yes ____ No

List teaching endorsements and expiration dates:

Subject/Endorsement No.	Expires:	Subject/Endorsement No.	Expires:
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Are you currently certified as an Administrator in Connecticut? ____ Yes ____ No

List endorsements and expiration dates:

Administrator/Endorsement No.	Expires:	Administrator/Endorsement No.	Expires:
_____	_____	_____	_____
_____	_____	_____	_____

If you are not currently certified, are you eligible for Connecticut certification? ____ Yes ____ No

List endorsements for which you are eligible: _____

List other states in which you are currently certified to teach: _____

List other states in which you are certified as an administrator: _____

Do you have tenured status in Connecticut under C.G.S. Sec. 10-151? ____ Yes ____ No

District in which you achieved tenure: _____ Date Tenured _____

Do you hold a valid driver's license? ____ Yes ____ No In what state? _____

Do you hold a Commercial Driver's License (CDL)? ____ Yes ____ No Expires: _____

Do you hold a Public Passenger Transport Permit (PPTP)? ____ Yes ____ No Expires: _____

Do you hold any Trade Licenses? ____ Yes ____ No List trade licenses and expiration dates:

Trade/Type	Expires:	Trade/Type	Expires:
_____	_____	_____	_____
_____	_____	_____	_____

Do you hold a current Connecticut Coaching Permit? ____ Yes ____ No Expires: _____

MILITARY SERVICE:

Are you a U. S. Veteran? ____ Yes ____ No If yes, list branch: _____

Dates of Service: From _____ To _____

(Attach copies of graduate and undergraduate transcripts.)

If yes, what's the name of the high school you graduated from _____

School/University Address	Major	Minor	Dates Attended From/To	Degree Awarded	No. of Credits Completed

(Please list positions in chronological order, with current or most recent position first). Attach additional sheets if necessary.

School Name & Address	Assignment/ Subject(s) Taught	Employment Dates From/To	Reason for Leaving	Supervisor	Phone

95

OTHER WORK EXPERIENCE:

Attach additional sheets if necessary.

Employer Name/Address Job Title From/To Reason for Leaving Supervisor Name/Phone

If you are currently receiving pension benefits from either the Teachers Retirement System or the State Employees Retirement System, there are limits to the number of hours you may work without jeopardizing your pension. If you become an employee, you must advise us that you are a retiree. However, it is your responsibility to ensure that you do not exceed the allowable number of hours.

Are you related to any current employee of the Connecticut Department of Education or Connecticut Technical High School System (this includes related by marriage)? ☐ Yes ☐ No

If so, list name(s):

It is the policy of the Connecticut Technical High School System that no person shall be excluded from participation in, denied the benefits of, or otherwise discriminated against under any program, including employment, because of race, color, religious creed, sex, age, national origin, ancestry, marital status, sexual orientation, disability (including, but not limited to, mental retardation, past or present history of mental disorder, physical disability or learning disability), genetic information, or any other basis prohibited by Connecticut state and/or federal nondiscrimination laws. The Connecticut Technical High School System does not unlawfully discriminate in employment and licensing against qualified persons with a prior criminal conviction. Inquiries regarding the Connecticut Technical High School System's nondiscrimination policies and practices should be directed to William Turek, Title IX coordinator and 504 coordinator, (860) 807-2227, William.Turek@po.state.ct.us and/or, regarding race, color, national origin, age, sex and/or disability, to the U.S. Department of Education, Office for Civil Rights, 33 Arch Street, Suite 900, Boston, Massachusetts 02110-1491; telephone number (617) 289-0111; fax number (617) 289-0150; TTY/TDD (877) 521-2172. The Connecticut Technical High School System is an equal opportunity/affirmative action employer.

I understand that if I am employed by the Connecticut Technical High School System I will be required to submit to a state and national criminal history records check for a period of 30 days from my date of employment, and I will be required to submit to fingerprinting, **at my expense**, for purposes of submitting my fingerprints to the Federal Bureau of Investigation for a national criminal history records check. If my position requires me to obtain and maintain a Commercial Drivers License (CDL), I understand that it will require periodic drug and alcohol screening in accordance with federal regulation.

I hereby authorize any and all law enforcement agencies, current and former employers, credit agencies and academic institutions to supply any information regarding my background to the Connecticut Technical High School System and to its agents and employees, and I hereby release all such former employers, law enforcement agencies, credit agencies and academic institutions, their agents and employees from any liability arising from the supplying and use of such information.

I hereby certify that all of the information stated herein is accurate, complete and true to the best of my belief. I understand and agree that a false or dishonest answer to any question or the omission of pertinent information may be grounds for immediate termination of my employment.

Signature of Applicant

Date

The Connecticut State Department of Education is an Affirmative Action/Equal Opportunity Employer.

APPENDIX D

CONNECTICUT TECHNICAL HIGH SCHOOL SYSTEM
APPLICATION FOR ADMISSION

Connecticut Technical High School System
Application for Admission

In order to be considered for admission to a Connecticut Technical High School, you must:

Fill out and sign this application and submit it to your school counselor as soon as possible; complete the Grade 7 Connecticut Mastery Test, if you have not completed the Grade 7 Connecticut Mastery Test (CMT) in Mathematics and Reading or you are a non-public school applicant you must arrange to take an alternative assessment with the Technical High School; and have no serious disciplinary offenses.

Your school must supply the Technical High School with the following data:

results of the Grade 7 Connecticut Mastery Test as reported on the Student Score Report;

a transcript of previous and current grades;

a record of previous and current attendance; and

a record of previous and current discipline infractions.

Applicants may include letters of recommendation (not required).

Incomplete applications will not be processed and returned to the applicant

Instructions

Complete this application with the appropriate signatures and return it to your school counselor, principal or teacher. Your school counselor will complete the sending school section of this application and forward your application, transcript of grades, attendance and discipline infractions to the Connecticut Technical High School. Letters of reference and/or personal statements from the student may be attached.

This application requests information about your national origin, gender, racial or ethnic group, and primary language spoken in the home. Providing this information is voluntary. The information you do provide will be used for record-keeping purposes only; it will not be used as a factor in any action concerning education, activities or employment.

Student Name: _____

Sending School: _____

Name of Technical High School Applying To: _____

Office Use Only

Reading Test Score _____ Mathematics Test Score _____ Grades _____ Attendance _____

Personal Information
To be completed by the student and parent/guardian

Full Name: _____
(Last) (First) (Middle)

Gender: Male Female

Racial or Ethnic Group: American Indian or Alaskan Native (1)
Asian American or Pacific Islander (2)
Black (3) White (4) Hispanic (5)

Residence Address: _____
Box, Apartment, Street Name and Number)

(City or Town) (State) (Zip Code)

Mailing Address: _____
(If different from residence address) (Box, Apartment, Street Name and Number)

(City or Town) (State) (Zip Code)

Email Address: _____

Primary Language: _____

What language did you learn to
speak first? _____

What language is spoken the most by your parents/guardians or other persons
living in your home?

What language do you speak the
most at home? _____

Grade Applying For: ____9 ____10 Trade/Technology You Wish to Learn:
Other Trade/Technology Interests: _____

Current School: _____ Current Grade: ____
Letter(s) of Recommendation Included: ____ Yes ____ No

RELEASE OF RECORDS

I approve this application and I, the undersigned, hereby give permission for the
_____ School to release the

(name of school)

School records of _____ to

(student name)

_____ Technical High

(name of Technical High School)

School for the purpose of admission/placement at that school. Such records include,
but are not limited to, course grades, discipline records, standardized test results,
504 Plans, IEP and/or PPT records, attendance records, school health records,
records of extracurricular activities and psychological reports.

Signature of Parent/Guardian Date: _____

Signature of Applicant Date: _____

It is the policy of the Connecticut Technical High School System that no person shall be excluded from participation in, denied the benefits of, or otherwise discriminated against under any program, including employment, because of race, color, religious creed, sex, age, national origin, ancestry, marital status, sexual orientation, or disability (including, but not limited to, mental retardation, past or present history or mental disorder, physical disability or learning disability), genetic information, or any other basis prohibited by Connecticut state and/or federal nondiscrimination laws. The Connecticut Technical High School System does not unlawfully discriminate in employment and licensing against qualified persons with a prior criminal conviction. Inquiries regarding the Connecticut High School System's nondiscrimination policies and practices should be directed to Dr. Abigail Hughes, Superintendent of Schools, Connecticut Technical High School System, 25 Industrial Park Road, Middletown, CT 06457, and/or, regarding race, color, national origin, age, sex and/or disability to the Office for Civil Rights, U.S. Department of Education, Boston, MA 02110-1491, telephone 617.289.0111, fax 617.289.0150, TTY/TDD 877.521.2172. The Connecticut Technical High School System is an equal opportunity/affirmative action employer.

School Information to be Completed by the Sending School

Incomplete applications will not be processed and will be returned to the applicant's parent/guardian.

Student Name: _____ Grade: _____

Academic Information

Please provide the following information, or attach a transcript with this information along with the student's Grade 7 CMT results.

ACHIEVEMENT Record	Previous Grade Final Average	Current Grade Term 1
Mathematics		
Science		
English		
Social Studies		
Absent Unexcused		

The student's final transcript, ELL program records, 504 plan, special education records, and health records are required at the end of the year but no later than July 8 for all accepted applicants.

Acceptance is contingent upon successful completion of current grade and promotion to the next grade.

Student Behavior

Please provide the following required discipline information on the above named student.
If you answered yes to any of the questions below please attach the student's complete discipline record.

Has this student participated in a violent criminal offense, as determined by State Law, while in or on the grounds of a school? ☐ Yes ☐ No

Has this student committed a gun-free schools violation (possession of a firearm or explosive device that resulted in expulsion)? ☐ Yes ☐ No

Has this student participated in an "other weapon" incident resulting in expulsion?
☐ Yes ☐ No

Does this student have any other discipline infractions (dangerous or criminal offenses)?
☐ Yes ☐ No

Leadership

Has this student participated in any in-school or out-of-school leadership activities?
☐ Yes ☐ No

If yes, please attach a statement from the student that details his/her participation in leadership activities. 1 to 3 Bonus Points

Has this student been identified as gifted or talented? If yes, please check.

Gifted ☐ Talented ☐

Special Education, 504 and Support Services

Does the student receive any special education services? ☐ Yes ☐ No

If yes, date of last triennial evaluation: _____

If yes, please describe:

Has the student been identified as 504 eligible and receive services? ☐ Yes ☐ No

If yes, please describe:

Does the student receive any support services other than special education?

☐ Yes ☐ No

If yes, please describe:

ELL (English Language Learner) Support Services

Does the student receive bilingual services? ☐ Yes ☐ No If yes, date
bilingual services began: _____

Does the student receive ESL services? ☐ Yes ☐ No If yes, date
ESL program services began: _____

If you answered yes to any of the above ELL support services questions, you must attach the complete Language Assessment Scale (LAS LINKS) Grade 8 Student Report.

Required to be completed by the Sending School

Do you recommend this candidate for admission? ☐ Yes ☐ No

Comments:

School Name:

Date:

Signature:
Title:

APPENDIX E

POLICY REGARDING GRADUATION REQUIREMENTS AND BASIC SKILL
REQUIREMENTS FOR GRADUATION

Policy Regarding Graduation Requirements and Basic Skill Requirements for Graduation

The CTHSS graduate will be expected to attain the following knowledge by content area:

English Language Arts: Demonstrate proficiency, confidence, and fluency in reading, writing, listening, speaking, and viewing; the graduate will explore and respond to classical and contemporary texts from many cultures and historical periods.

Mathematics: Apply a range of numerical, algebraic, geometric, and statistical concepts and skills to formulate, analyze and solve real world problems.

Science: Demonstrate knowledge of the basic concepts of, and interrelationships among biology, chemistry, physics, environmental sciences, and be able to apply scientific skills, processes and methods of inquiry to the real world.

Social Studies: Demonstrate knowledge of history, civics and government, geography and economics, the social sciences, and humanities, including one year of U.S. history and one year in civics/government.

Technology Education: Demonstrate knowledge about the nature, power, influence and effects of technology and be able to design and develop products, systems and environments to solve problems.

Health, Wellness and Physical Fitness: Understand and develop behaviors that promote lifelong health and wellness, and recognize the importance of and participate in physical activities and learning designed to maintain and enhance healthy life styles.

Learning Resources and Information Technology: Use information and technology effectively and be able to apply related strategies to acquire basic skills and content knowledge.

Trade/Technology: Demonstrate the set of skills and competencies required to enter the workforce, be accepted in apprenticeships or pursue postsecondary studies.

Credit Requirements for Graduation Beginning with the Class of 2008-2010

Students are expected to schedule and earn sufficient credits each year, in grades 9, 10, 11 and 12 in order to meet graduation requirements. Beginning with the Class of 2008, twenty-eight and one-half credits are required for graduation and must include courses from the following content areas:

Trade/Technology Program	9 credits
Cluster Trade Programs	
Theory Integrated Within Trade	
Exploratory Program (freshmen only)*	3 credits
Academics	
English	4 credits
Social Studies (includes Civics)	3 credits
Mathematics	3 credits
Science	3 credits
Other Requirements	
Physical Education	1 credit
Health	1/2 credit
Electives	2 credits

*Includes exploratory for freshmen students only. Two credits will be issued for the first two phases of exploratory and one credit will be issued for phase three. Transfers into the system would come with other courses for application toward graduation.

Promotion Requirements

- To achieve 10th grade status a student must accumulate 6 credits and receive a 60 or higher in phase III of exploratory and a combined grade of 60 or higher for phase I, II and III of exploratory
- To achieve 11th grade status a student must accumulate 13.5 credits and receive a 60 or higher in trade/technology
- To achieve 12th grade status a student must accumulate 21 credits and receive a 60 or higher in trade/technology
- Seniors must earn a minimum of 5 credits and must participate in the NOCTI assessment

Promotion requirements are required to enter 10th, 11th, and 12th grade in order to assure that a student has accumulated credits needed for graduation. If students do not meet the minimum credit requirement as they move from grade to grade they will have difficulty graduating in four years.

If a student does not meet the requirements to be promoted to the next grade, he/she may opt to

- repeat their grade if space permits or
- return to their local district.

If a student meets the minimum credit requirement for promotion the student may promote to the next grade with deficiencies, however the student will need to make-up the deficiency prior to graduation either through

- summer make-up, where available, or
- taking the failed course again in subsequent years, when scheduling permits.

What is meant by a deficiency is that the student could promote with a failure in English knowing that he/she will not graduate with the deficiency and will need to make up the course in subsequent years by taking an additional English course.

Language Arts Labs/Math Labs Required for All Students in Grades Nine and Ten

The Language Arts and Math labs will give students a grade independent of the English or mathematics grade. Students taking both the Language Arts Lab and Mathematics Lab will receive $\frac{1}{4}$ credit each for the school year regardless of the amount of time in each lab. For students taking only the Language Arts Lab or only the Mathematics Lab for the entire year, $\frac{1}{2}$ credit will be issued.

The grades earned in the labs will count toward a student's GPA and honor roll. If a student does not attain a 70 or better in the lab, then they are excluded from the honor roll.

Exploratory Program Requirement for Students to Continue Beyond Grade Nine

The Connecticut Technical High School System's exposes each ninth grade student to the technology exploratory program. The exploratory program introduces each student to the goals and objectives for each trade/technology; provides an objective measure of student performance, and a measure of potential for success for each student in all trades/technologies.

The ninth grade exploratory year is viewed as an extension of the admission process that serves as (1) a verification of the student's desire for a technical education and (2) as an assessment of technical aptitudes. The exploratory program is divided into three phases; phase I gives students career information on each trade offered, phase II gives each student a hands-on experience in three trade areas, and phase III a permanent placement where the student begins the study of a technology that he/she will concentrate on for the next three years.

In order for a student to continue in the CTHSS beyond grade nine, he/she must successfully complete the exploratory program. Successful completion is defined as a grade of 60 or higher in phase III as well as a cumulative grade of 60 or higher in the exploratory program. Failure to successfully complete the exploratory program will make it necessary for a student to transfer back to his/her sending district.

Basic Skills Requirement for Graduation

Language Arts

Performance Standard

Students will demonstrate the ability to read a piece of literature and respond critically in writing; read and interpret information; and write using standard English conventions.

Options

Students have multiple opportunities over the course of their junior and senior year to demonstrate their performance relative to the Language Arts performance standard. Students satisfy the district performance standards for the basic skills in language arts if they have:

1. Achieved a score in either band three (Proficient), four (Goal) or five (Advanced) on a related section of the Connecticut Academic Performance Test – Writing Across the Disciplines and/or Reading Across the Discipline; or

2. Achieved a score at the 50th percentile or higher on a related section of the Preliminary Scholastic Assessment Test/National Merit Scholarship Qualifying Test or the Scholastic Assessment Test (PSAT/NMSQT/SAT) – verbal and/or writing skills; or
3. Passed the required English 11 or English 12 course with a 70 or higher; or passed an English 11 or English 12 course with a 70 or higher; or completed an independent study project in English with a 70 or higher.

Mathematics

Performance Standard

Students shall demonstrate the ability to solve multiple step mathematical problems that require demonstration of basic math operations including fractions, decimals and percentages and the use of algebraic equations; and explain in writing how they arrived at each answer.

Options

Students have multiple opportunities over the course of their junior and senior year to complete the mathematics performance standard. Students satisfy the district performance standards for basic skills in mathematics if they have:

1. Achieved a score in either band three (Proficient), four (Goal) or five (Advanced) on the Connecticut Academic Performance Test in Mathematics; or
2. Achieved a score at the 50th percentile or higher on the mathematics section of the Preliminary Scholastic Assessment Test/National Merit Scholarship Qualifying Test or the Scholastic Assessment Test (PSAT/NMSQT/SAT), or
3. Passed one of the following courses with a 70 or higher: Algebra II, Pre-Calculus, Calculus, AP Calculus, Statistics, Honors Statistics, AP Statistics or senior math electives; or completed an independent study project in mathematics with a 70 or higher.

Science

Performance Standard

Students in the Class of 2008 and beyond shall demonstrate the ability to use scientific inquiry skills to explore world life problems using the content of biology, physics, chemistry and earth science; evaluate the information for validity and reliability; and use that information to support a position on a contemporary scientific issue.

Options

Students have multiple opportunities over the course of their junior and senior year to complete the performance standard. Students satisfy the district performance standards for basic skills in science if they have:

1. Achieved a score in either band three (Proficient), four (Goal) or five (Advanced) on the 3rd generation of the Connecticut Academic Performance Test in science, or
2. Passed one of the following courses with a 70 or higher, Biology, Chemistry, Physics, Honors Physics, AP Physics, or a senior science electives course; or completed an independent study project in science with a 70 or higher.

Technology

Performance Standard

Students shall demonstrate the set of skills and competencies required to enter the field, be accepted in apprenticeships or pursue post-secondary technical studies as evidenced by their technology portfolio.

Options

Students have multiple opportunities over the course of their junior and senior year to complete a trade/technology portfolio. The trade/technology portfolio includes a skills checklist and competency assessment list and accomplishments.

Options If Requirements Are Not Met By Date of Graduation

Seniors who are not eligible for graduation with their class due to their failure to meet the district graduation requirements in one or more subjects as described above, may select one of the following options:

1. Enroll in summer school and pass the requirement and receive a high school diploma; or
2. Return in September as a fifth year student until such requirement is met.

Transfers and Special Cases

Transfers

If a student transfers into the Connecticut Technical High Schools (CTHS) after completing at least three years in a high school in another district, they shall be exempt from the CTHS performance standards requirement for graduation.

Special cases

Performance standards apply to all students requiring special education. The Planning and Placement Team (PPT) may adapt the standard of performance and/or the graduation expectation, by indicating such accommodation in the Individualized Education Plan (IEP).

A student whose primary language is not English may be exempted from the district's performance requirement in one or more standards based on federal and state legislation. The need for the exemption must be directly attributable to the language limitations of the students as indicated on the Bilingual Individual Education Program (BIEP) of the English Language Learners (ELL). A plan of action that includes classroom and language support interventions must be outlined in the student's BIEP.

Guidelines for Participation in Graduation Exercises

1. In order to participate in a Technical High School graduation ceremony, a student must meet the requirements of the Promotion, Retention and Graduation Policy. Students who have not met the graduation requirements may not "walk" during the ceremony.
2. An exception may be made in special circumstances such as:
 - a. a mistake has been made regarding distribution requirements or promotion requirements;
 - b. there are emergency health reasons; or
 - c. absences have been excused, in accordance with the Attendance Policy.
3. A decision relative to special circumstances is the responsibility of the principal; however, an appeal may be brought to the superintendent.

APPENDIX F

COLLECTIVE EFFICACY BELIEF SCALE

Collective Efficacy Belief Scale

Tschannen-Moran and Woolfolk Hoy

Collective Teacher Beliefs

Directions: Please indicate your opinion about each of the questions below by marking any one of the nine responses in the columns on the right side, ranging from (1) "None at all" to (9) "A Great Deal" as each represents a degree on the continuum. Please respond to each of the questions by considering the current ability, resources, and opportunity of the teaching staff in your school to do each of the following.

This questionnaire is designed to help us gain a better understanding of the kinds of things that create challenges for teachers. Your answers are confidential.

	None at all	Very Little	Some Degree	Quite A Bit	A Great Deal				
1. How much can teachers in your school do to produce meaningful student learning?	1	2	3	4	5	6	7	8	9
2. How much can your school do to get students to believe they can do well in schoolwork?	1	2	3	4	5	6	7	8	9
3. To what extent can teachers in your school make expectations clear about appropriate student behavior?	1	2	3	4	5	6	7	8	9
4. To what extent can school personnel in your school establish rules and procedures that facilitate learning?	1	2	3	4	5	6	7	8	9
5. How much can teachers in your school do to help students master complex content?	1	2	3	4	5	6	7	8	9
6. How much can teachers in your school do to promote deep understanding of academic concepts?	1	2	3	4	5	6	7	8	9
7. How well can teachers in your school respond to defiant students?	1	2	3	4	5	6	7	8	9
8. How much can school personnel in your school do to control disruptive behavior?	1	2	3	4	5	6	7	8	9
9. How much can teachers in your school do to help students think critically?	1	2	3	4	5	6	7	8	9
10. How well can adults in your school get students to follow school rules?	1	2	3	4	5	6	7	8	9
11. How much can your school do to foster student creativity?	1	2	3	4	5	6	7	8	9
12. How much can your school do to help students feel safe while they are at school?	1	2	3	4	5	6	7	8	9

For office use only.

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

APPENDIX G

CONNECTICUT ACADEMIC PERFORMANCE TEST (CAPT)

CONNECTICUT ACADEMIC PERFORMANCE TEST (CAPT)

State of Connecticut Department of Education

Purposes and Rationale

The Connecticut General Statutes (Section 10-14n) mandate a statewide assessment to be administered to all public school students in Grade 10. The legislation specifies that the test cannot be used as the sole criterion for graduation or promotion, but that it will be the basis for awarding Certification of Mastery for those students who achieve the state goals in any of the subjects tested. It further specifies that a record of such performance should become part of the student's permanent school record and the official high school transcript. P.A. 01-166 further states that by September 1, 2002, local and regional boards of education must include results from the CAPT when developing criteria to be used in assessing whether students have the basic skills necessary for graduation. This applies to classes graduating in 2006 and after.

The Connecticut Academic Performance Test (CAPT) is a logical extension of the state's long-established testing program. For more than a decade, students have been tested at Grades 4, 6 and 8 on the Connecticut Mastery Test (CMT). The CAPT extends Connecticut's testing program to the high school level, but serves somewhat different purposes than the previously established CMT.

The purposes of the CAPT program are to:

- set high expectations and standards for student achievement on a comprehensive range of important skills and knowledge;
- emphasize the application and integration of skills and knowledge in realistic contexts;
- promote better instruction and curriculum by providing useful test achievement information about students, schools and districts; and
- provide an expanded measure of accountability for all levels of Connecticut's education system up to and including high school.

The CAPT assesses and reports on student performance in four areas: Mathematics, Reading Across the Disciplines (based on a Response to Literature test and a Reading for Information test), Writing Across the Disciplines (based on an Interdisciplinary Writing test and an Editing & Revising test), and Science. The CAPT requires more from students than other, traditional tests. While traditional assessments typically measure what students know, the CAPT uses state-of-the-art assessment techniques, such as performance tasks, to measure what students can do with what they know. The CAPT measures students' abilities to apply what they have learned in school to situations they may face throughout their lives.

The CMT and CAPT assessments were approved by the United States Department of Education under the Improving America's Schools Act of 1994.

APPENDIX H

DESCRIPTION OF PERFORMANCE LEVELS

Connecticut Academic Performance Test (CAPT)
State of Connecticut Department of Education
Description of Performance Levels

Mathematics

Advanced: Students who score at this level possess knowledge and skills beyond those necessary to perform the high level of tasks and assignments expected of Connecticut's students. These students demonstrate well-developed conceptual understanding and computational skills as well as an advanced ability to solve complex and abstract mathematical problem

Goal: Students who score at this level possess the knowledge and skills necessary to perform the high level of tasks and assignments expected of Connecticut's students. These students demonstrate well-developed conceptual understanding, computational skills, and problem-solving skills.

Proficient: Students who score at this level demonstrate adequately developed conceptual understanding and computational skills, and adequately developed problem-solving skills.

Basic: Students who score at this level demonstrate adequately developed computational skills, but limited conceptual understanding and problem-solving skills.

Below Basic: Students who score at this level demonstrate some computational skills, but very limited conceptual understanding and problem-solving skills.

Reading

Advanced: Students who score at this level possess knowledge and skills beyond those necessary to perform the high level of tasks and assignments expected of Connecticut's students. Generally, these students can comprehend textbooks and other materials at reading levels beyond their grade, determine the main idea, draw conclusions about the author's purpose and make judgments about the text's quality and themes.

Goal: Students who score at this level possess the knowledge and skills necessary to perform the high level of tasks and assignments expected of Connecticut's students. Generally, these students can comprehend textbooks and other materials intended for their grade level, can determine the main idea, draw conclusions about the author's purpose and make judgments about the text's quality and themes.

Proficient: Students who score at this level can comprehend most grade-level or below-grade-level textbooks and other materials. They can generally determine the main idea, have an adequate understanding of the author's purpose and are able to make some judgments about a text's quality and themes.

Basic: Students who score at this level have difficulty comprehending below grade-level textbooks and other materials. They may also have difficulty determining the main idea,

understanding the author's purpose and making judgments about a text's quality and themes.

Below Basic: Students who score at this level have difficulty comprehending below grade-level textbooks and other materials. They also have difficulty determining the main idea, understanding the author's purpose and making judgments about a text's quality and themes.

Writing

Advanced: Students who score at this level possess knowledge and skills beyond those necessary to perform the high level of tasks and assignments expected of Connecticut's students. Generally, these students can produce papers that show strong organization, and are fluent, well-developed, and fully elaborated with specific details. These students also possess the skills necessary to compose, edit and revise a written piece.

Goal: Students who score at this level possess the knowledge and skills necessary to perform the high level of tasks and assignments expected of Connecticut's students. Generally, these students can produce fluent papers that are well-developed, well organized, and elaborated with general and specific details. These students also generally possess the skills necessary to compose, edit and revise a written piece.

Proficient: Students who score at this level generally can produce papers that are fluent, organized, developed and elaborated with some details. They also possess most of the skills necessary to compose, edit and revise a written piece.

Basic: Students who score at this level generally produce papers that are underdeveloped, brief with few details and sometimes confusing due to lack of organization or fluency. These students tend to demonstrate limited skills to compose edit and revise a written piece.

Below Basic: Students who score at this level generally produce papers, which are very weak responses. These papers may be too brief to indicate organization, or they may be awkward and confusing. These students tend to demonstrate very limited skills to compose, edit and revise a written piece.

APPENDIX I

CONNECTICUT ACADEMIC PERFORMANCE TEST (CAPT) ADMINISTRATION

STATE OF CONNECTICUT
STATE DEPARTMENT OF EDUCATION
Connecticut Academic Performance Test (CAPT) Administration

Testing contractors:

Harcourt Educational Measurement (HEM): contractor for census (live) testing Questar, Inc., located in Apple Valley, MN: CAPT supplemental testing.

Testing Sessions

The length of time for each CAPT session is specified below, broken down into actual student testing time and additional administration time necessary for distributing materials and reading directions.

Test Session Testing Directions Total Time

Response to Literature: 70 minutes 10 minutes 80 minutes

Reading for Information: 45 minutes 15 minutes 60 minutes

Mathematics:

Session I 75 minutes 15 minutes 90 minutes

Break: If both sessions are given on the same day 10-30 minutes

Session II 75 minutes 5 minutes** 80 minutes

Science:

Session I 50 minutes 15 minutes 65 minutes

Break: If both sessions are given on the same day 10-30 minutes

Session II 50 minutes 5 minutes** 55 minutes

Interdisciplinary Writing:

Session I 65 minutes 15 minutes 80 minutes

Session II 65 minutes 15 minutes 80 minutes

Editing & Revising 25 minutes 10 minutes 35 minutes

** Allow 15 minutes for directions if administered on separate days.

☐ Within a school, each section of the test must be administered to all Grade 10 students and retest students in grades 11 and 12 at the same time on the same day.

☐ According to state law, CAPT testing may not begin prior to 9:00 a.m.

☐ Due to the participation rate requirements of *No Child Left Behind*, it is essential to test all grade 10 students during the test administration window of March 1 – 28, 2006 inclusive.

Students who are absent from any subtest should be administered a make-up test as soon as they return to school in order to ensure that they participate in all CAPT subtests.

☐ Students must be tested in a regular classroom setting. The test may not be administered to a large group of students that exceeds a normal class size. If a room other than a regular classroom is used (e.g., library, cafeteria), only one normal class size

of students may be tested in that setting. Please note that there is no *minimum* number of students required within a setting.

□ There are test setting accommodations available to students enrolled in special education and for students who are English Language Learners. For a complete list of available accommodations, refer to the *Assessment Guidelines* available on the CSDE website (www.state.ct.us/sde).

□ *Mathematics* sessions II and I do not need to be administered on the same day. Separate test booklets will be produced for each session. If you choose to administer the *Mathematics* sessions on separate days, allow an additional 15 minutes for directions on day two.

□ *Science* sessions II and I do not need to be administered on the same day. Separate test booklets will be produced for each session. If you choose to administer the *Science* sessions on separate days, allow an additional 15 minutes for directions on day two.

□ Be advised that students must participate in each subtest or testing session for a given content area in order to earn a score. For example, if a student completes one *Mathematics* session and is absent for the second session, the student will be reported as ABSENT for *Mathematics*. If a student completes one *Mathematics* session and leaves the second session blank, the student will be reported as LEFT BLANK for *Mathematics*. The same reporting rules apply to *Science*, *Reading Across the Disciplines*, and *Writing Across the Disciplines*.

□ A maximum of two sessions of testing may be scheduled per day. For instance, the *Response to Literature* and the *Editing & Revising* tests may be administered on the same day. This applies to make-up testing as well.

□ When administering two sessions on the same day, a break of between 10 and 30 minutes should be allowed between sessions.

□ Each student must have a calculator for the entire *Mathematics* test. Students may use any calculator provided to them or any calculator of their choosing, including those with limited text entry capabilities such as some scientific and graphing calculators. The use of a Personal Digital Assistant such as a Palm Pilot is **not** permitted.

□ There is a *Science* hands-on activity that must be administered prior to the test. Reminder: there are Braille and large-print versions of the *Science Performance Task* which should be used with students receiving these accommodations.

REFERENCE LIST

REFERENCE LIST

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Professional Experience

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Duties involved creating, implementing and assessing paraprofessional programs and workshops on inclusive practices.
- 1998 - 1999: **Special Education Coordinator**, Enfield Public Schools, Enfield, CT.
Administrative duties included preschool through high school case supervision, program development and management, staff supervision and evaluation.
- 1986 - 1998: **Learning Disabilities Teacher/Consultant**, Wethersfield High School, Wethersfield, CT. Taught students with learning disabilities and attentional disorders through resource services and general education collaboration; administered educational evaluations; provided district-wide teacher in-services in strategies and content enhancement routines.
- 1986 - 1988: **Learning Disabilities Consultant**, Silas Deane Middle School, Wethersfield, CT. Provided consultative services to all teacher teams; administered educational evaluations; developed the Strategies Intervention Model Demonstration Site to provide state and national visitors with opportunities to experience strategic learning processes within a middle school setting (site opened for 1992 and 1993 school years).
- 1977 - 1986: **Special Education Teacher**, East Windsor High School, East Windsor, CT. Provided academic and social skill instruction in a self-contained program for students with learning, attentional, and behavioral needs.